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An Assessment of

Development and Production Potential of Federal Coal Leases

Volume II—Working Papers

Part I:— Vol. II: Analysis of Federal Coal Leases in Mine Plans: Detailed Summaries of Mine Plans and Lease Blocks in Colorado, New Mexico, and Utah

This is an OTA Working Paper that has neither been reviewed nor approved by the Technology Assessment Board

June 1984

CONGRESS OF THE UNITED STATES
Office of Technology Assessment
Washington, D. C. 20510

J952-98

Office of Technology Assessment

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An Assessment of

Development and Production Potential of Federal Coal Leases

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June 1984

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Office of Technology Assessment
Washington, D. C. 20510

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Preface

This volume contains papers written for OTA to assist in preparation of the report *An Assessment of Development and Production Potential of Federal Coal Leases*. OTA does not endorse these papers. In several instances, the OTA report reaches somewhat different conclusions because of additional information which was obtained later. These papers, however, may prove valuable for readers needing more detailed or specific information that could be accommodated in the final assessment report, and are being made available for such purposes.

OTA WORKING PAPER I

PART II

ANALYSIS OF FEDERAL COAL LEASES IN MINE PLANS

DETAILED SUMMARIES OF MINE PLANS AND LEASE BLOCKS IN COLORADO, NEW MEXICO AND UTAH

DECEMBER 1980

Prepared by:

DAMES & MOORE
DENVER, COLORADO

For

THE CONGRESS OF THE UNITED STATES
OFFICE OF TECHNOLOGY ASSESSMENT
WASHINGTON, D.C. 20510

OTA WORKING PAPER

This report is an OTA Working Paper, which was used in the preparation of OTA's final assessment report. OTA makes these working papers available for the use of those readers desiring a more detailed or technical discussion of a subject than can normally be accomodated in our final report. As an OTA Working Paper, this report has not been reviewed or approved by the Technology Assessment Board. The findings and conclusions expressed in this report are those of the authors and do not necessarily reflect the views of OTA, the coal leasing project advisory panel, or the Technology Assessment Board.

FOREWORD

This report was prepared for the Office of Technology Assessment by Dames and Moore of Denver Colorado. The report provides an analysis of the production potential of federal coal leases in 4 western states, Colorado, New Mexico, Oklahoma, and Utah. Primary emphasis is given to the coal leases in the Rocky Mountain States. This report was used by OTA in the preparation of its report, An Assessment of the Development and Production Potential of Federal Coal Leases.

Under contract to OTA, Dames and Moore reviewed all mining plans for federal coal leases that were filed with the U.S. Office of Surface Mining in Denver Colorado on or before September 30, 1980. (Mining plans must be filed for all operating mines and all proposed mines.) Dames and Moore prepared a summary of each mining plan and analyzed whether the mine could support the proposed production levels in the mine plan and identified any geological, engineering, environmental or transportation problems that might affect the mine's development or production rate. Additionally, the report includes an analysis of whether each mine's production rate would be sufficient to meet the requirement that Federal lessees produce 2.5 % of the lease reserves by June 1, 1986, or with an extension, by 1991. Dames and Moore also prepared an analysis of the development and production potential for certain undeveloped Federal leases for which no mining plans had been submitted. The undeveloped leases to be analyzed were selected by OTA.

This report consists of two parts. Part I is a summary of the report's methodology and conclusions and tabular summaries of information on each mining plan and lease block. Part II contains the detailed mine plan and lease block summaries. Information on active and proposed mines came from the actual mining plans prepared by the mine operators and filed with the Office of Surface Mining, from published environmental impact statements, and from comments submitted by the operators after reviewing the draft summaries. Information on undeveloped leases came from published materials, from OTA state task force reports and from sources in the Bureau of Land Management and the U.S. Geological Survey. This report contains no confidential information.

The major contributors to this report from Dames and Moore were Lawrence E. Wellborn and David Huttenlock. Karen Larsen of OTA was the contract supervisor.

This report is an OTA working paper which was used in the preparation of OTA's assessment report. Unlike OTA's final report, this working paper has not been reveiwed or approved by the Technology Assessment Board. All conclusions and opinions in this report are those of the authors and do not necessarily reflect the views of OTA, the project advisory panel, or the Technology Assessment Board.

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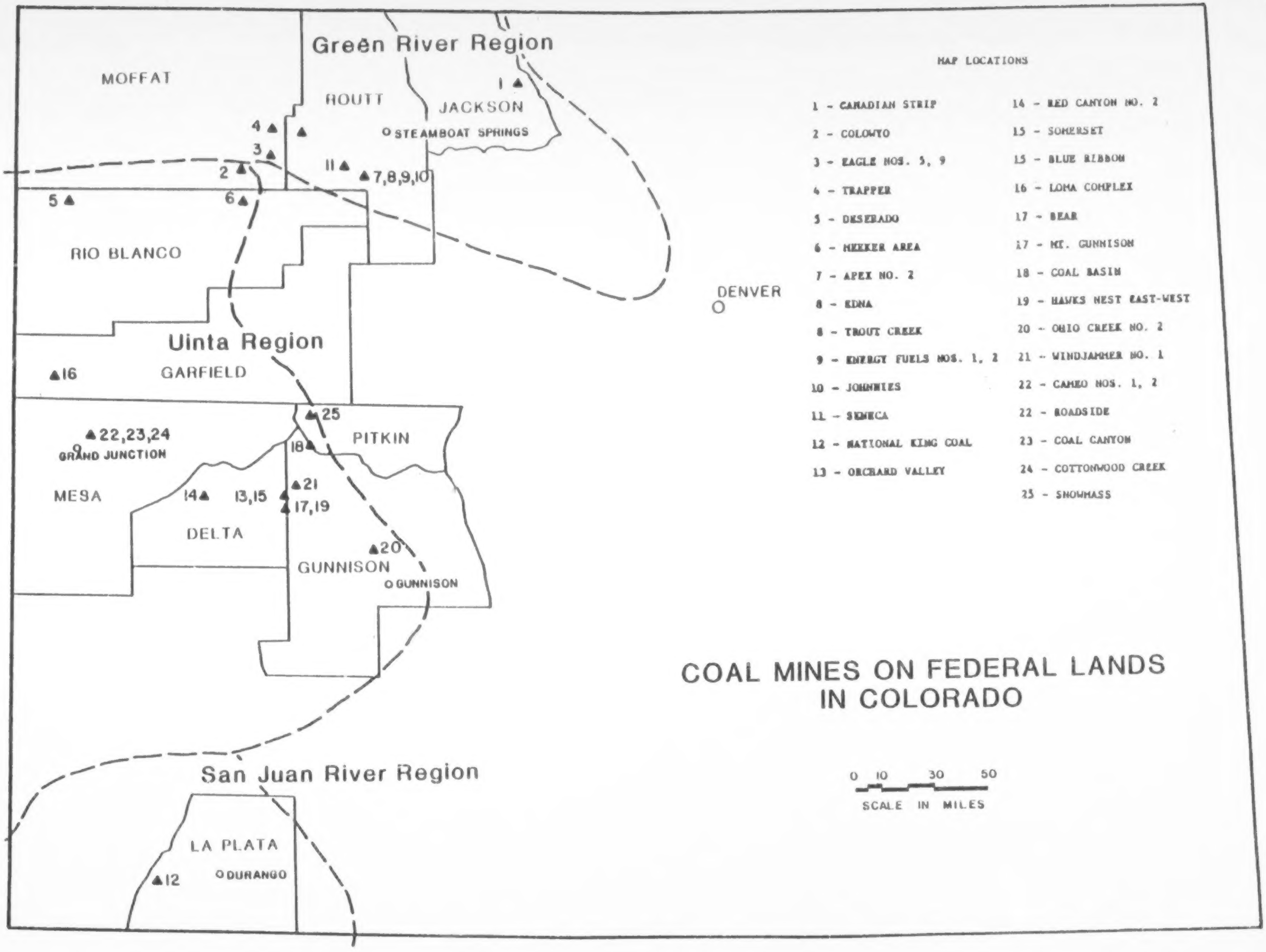
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MOFFAT
ROUTT
JACKSON
STEAMBOAT SPRINGS
RIO BLANCO
Uinta Region
GARFIELD
MESA
GRAND JUNCTION
DELTA
PITKIN
GUNNISON
GUNNISON
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COAL MINES ON FEDERAL LANDS
IN COLORADO

6

CANADIAN STRIP MINE

Wyoming Fuel Company
Map Location C - 1
Federal Coal Lease C27931 (90 acres)
Jackson County, Colorado

The Canadian Strip Mine, owned and operated by Wyoming Fuel Company, is located in Jackson County, approximately 12 miles east of the town of Walden, Colorado.

The tracts comprising the Canadian Strip Mine property is described below:

Property Description	Acres
Federal Coal Lease C27931 comprised of tracts in sections 2, 10, and 11, T. 8 N., R. 78 W., Sixth Principal Meridian	90.0

The Canadian Strip Mine is located on the eastern flank of the McCallum Anticline near the nose. The anticline is found in the North Park area of north central Colorado. The North Park region can be geomorphically classified as an intermontane area, enclosed by the Medicine Bow Range to the east, the Park Range to the west, and the Rabbit Ears Range to the south. A broad synclinal fold and associated local folding and faulting underlies the North Park region. These local folds and faults are probably the result of compression during the formation of the larger synclinal trough. The McCallum Anticline is one of these local folds. The anticline can be categorized as doubly plunging and assymmetrical about its axis, trending N. 45°W. and almost due south. The east flank of the anticline dips more steeply than the west flank. In places along the east flank the beds are near vertical or overturned.

The coal seams of the North Park area lie in the Coalmont Formation. Two major coal seams or zones exist within the Coalmont Formation in the vicinity of the Canadian Strip Mine. They are, in ascending order, the

Sudduth seam and the Capron Seam. The Sudduth coal bed is the thickest and most widely developed seam in the region and is located at the base of the Coalmont Formation resting on or near the unconformity atop the Pierre Shale. The Capron seam is stratigraphically located about 2,400 feet above the Sudduth coal bed.

The Sudduth seam is present in the permit area near the southern nose of the McCallum anticline. The coal seam varies in strike from about N 18°E at the north boundary of the permit area to about 50 degrees E at the southwest boundary. The coal dips to the southeast and varies from a maximum of 35 degrees at the southern limit of the present pit to a minimum of 22 degrees near the nose of the anticline just outside the southwest boundary of the permit area.

A generalized statement of the stratigraphy would be to say that the sediments overlying the Sudduth coal bed consists of only two units. The lower unit immediately above the coal consists of interbedded sandstone, sandy siltstones and mudstones, whereas the upper unit is predominately "sand free", consisting of highly interbedded shales, mudstones and siltstones.

Recoverable coal reserves total approximately 150,000 tons. The coal exhibits the following characteristics: BTU/lb - 10,710, Sulfur - 0.27%, Ash - 8.4%, and Moisture - 12.74%.

Coal will be mined in an open pit haulback method, using trucks and shovels for overburden removal. The pit will follow the outcrop to the south and southwest in a series of 35-foot-high benches. Maximum economic mining depth is about 180 feet depending on the dip and thickness of the coal, resulting in an average stripping ratio of about 5.5 BCY overburden per ton of coal. Coal will be mined using either a front-end loader or backhoe to load trucks. The northwest pit wall slope will vary from 34 to 28 degrees as dictated by the dip of the coal. The southwest pit wall, or highwall, slope will be constructed at an average of 47 degrees, with 2:1 slopes between safety benches. Pit width will be about 400 feet. Trucks will haul coal from the pit (15% ramp) to the crusher, where it will be crushed to 2" X 0". Crushed coal will then be hauled to Walden (about 10 miles) by an independent contractor and loaded on Union Pacific railcars at the existing loadout facility.

All suitable topsoil and subsoil will be removed with scrapers in advance of mining, after larger vegetation has been removed, to maximize total topsoil and subsoil available for redistribution. It was estimated by the applicant that sufficient soils are available to cover the entire reclaimed land surface to a depth of 8 to 12 inches.

Production Capability Analysis

The haulback method for contour strip mining was developed in Appalachian coal fields of the eastern United States and is rarely seen in the western part of the country. It was developed as an environmentally acceptable alternative to simply stripping the overburden off the coal and dumping the spoils down the slope. This original form of contour stripping was responsible for the deep scars that characterize the sides of hills and mountains in Appalachia.

Depending on the thickness of the coal seam and the nature of the overlying topography, the haulback method can be used to produce large annual tonnages of coal. In the particular case of the Canadian Strip Mine; with an overall stripping ratio of 5:1, a coal seam that dips from 22 to 35 degrees, and a maximum overburden thickness of 180 feet; there should be no difficulty in meeting the projected annual production rate of approximately 92,000 tons. The only requirement is that the company have enough overburden removal and coal mining equipment on site.

Reclamation is quite straight-forward with the haulback method. First the topsoil is removed from the area to be stripped. Then as overburden removal progresses, the burden material is loaded into trucks by shovels and hauled around the area where the coal has already been extracted. It is then leveled and the topsoil replaced. In the case of the Canadian Strip Mine, reclamation is being done only 200 feet behind active coal mining.

There are no apparent transportation problems to interfere with production at the operation. The average monthly tonnage of 7500 tons must be hauled by truck only 12 miles one-way to the rail loadout facility in Walton. Even if trucks as small as 20 tons are being used, it will require only 20 round trips a day, five days a week.

Diligent Development Analysis

The bulk of the Canadian Strip LMU is located on lands other than federal leases. The recoverable coal located on federal lands is scheduled to be mined out by 1982. The total mine life is projected to extend to 1987. Hence, there is no apparent difficulty that would prevent the company from complying with the diligent development and continuous operation requirements.

STATE: Colorado **REGION:** GREEN River **COUNTY:** Jackson

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Canadian	Wyoming Fuel Company	C-27931	90①	90		Open Pit	3-1-80 Approved	0.12 TPY

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 0.731

SOURCE: OSM.

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

① Total acres involved -13.4

0.150 TONS ARE TO BE MINED.

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Colorado REGION: GREEN River COUNTY: Jackson

MINE NAME (OR LEASE BLOCK): Canadian

LESSEE(S) (OR OPERATOR): Wyoming Fuel Company

NUMBER OF LEASES IN BLOCK OR PLAN: 1

MINING METHOD: Open Pit

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Suddeth							
FORMATION								
RANK								
THICKNESS	19' (ave)							
Btu/LB	10,710							
SULFUR (%)	0.27							
ASH (%)	8.4							
MOISTURE (%)	12.74							
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH	0'-200'							
IN-PLACE RESERVES								
RECOVERABLE RESERVES	0.150							
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL	0.731		0.731	OSM
	SURFACE				
	UNDERGROUND				

NOTES: SUDDETH SEAM DIPS STEEPLY TO THE S.E. AT 28°-34°

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Colorado **REGION:** Green River **COUNTY:** Jackson

MINE NAME OR LEASE BLOCK
Canadian

LESSEE(S)
Wyoming Fuel
Company

NUMBER OF LEASES
1

DATE MINE OPENED: 6-2-80
PROJECTED CLOSING DATE: 1987
REMAINING MINE LIFE: 7

REMAINING RECOVERABLE RESERVES:
FEDERAL: 0.731
NON-FEDERAL:

MINE DESIGN CAPACITY
0.12 TPY
RECOVERY RATE:

CUMULATIVE PRODUCTION TO 1979: –
1979 ACTUAL PRODUCTION: –

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	—	0.06	
1981	—	0.09	
1982		.092	
1983		0.092	
1984		0.092	
1985		0.092	
1986		0.092	
1987		0.092	
1988			
1989			
1990			
Post 1990			

NOTES: TRUCK AND SHOVEL , HAULBACK METHOD - OPEN PIT

All Figures Shown in Million Tons

PRODUCTION SUMMARY

1A, #2

COLOWYO COAL MINE
COLOWYO COAL COMPANY
MAP LOCATION C - 2
FEDERAL LEASE: D034365 (2544.79 Acres)
MOFFATT COUNTY, COLORADO

Colowyo Coal Company is currently operating the Colowyo Coal Mine approximately 25 miles southwest of Craig, Colorado, immediately to the west and adjacent to Colorado State Highway 13-789 on 2,554.79 acres of Federally leased land. The 1980 production rate of 2,700,000 tons will be increased to 3,000,000 tons in 1981 and eventually to 4,500,000 tons per year in 1984.

The tract comprising the Colowyo Mine property is described below:

Property Description	Acres
Federal Coal Lease D034365 comprised of tracts in secs. 2-4, 9 and 10, T.3 N., R. 93 W., Sixth Principal Meridian	2,544.79

Open-pit mining of eight coal seams of the Williams Fork Formation with a stratigraphic section of 390 feet is planned. The seam thicknesses range from about 2-1/2 feet to more than 14 feet and they are interbedded with strata of sandstone, sandy shale, and carbonaceous shale that are from 14 to 80 feet thick. As much as five feet or more of surficial materials, alluvial deposits of silt and sand and residium, covers the overburden.

Predominance of fairly steep slopes, varying dip of the Williams Fork Formation strata from 3° to 10°, presence of faults, subsidiary folding and joint system, and alternating hard and soft beds in the overburden all contribute to production problems.

The coal mined at the Colowyo Mine is classified "between bituminous, class C and subbituminous, class A." Analyses of the drill hole cores taken from the eight mineable seams on the property indicate the following weighted average quantities:

Btu/lb	10,728
Ash	5.06%
Sulfur	0.4%
Carbon	46.23%
Volatile	33.90%
Moisture	14.81%

Recoverable reserves of the coal seams to be mined by open-pit method are reported as 165,000,000 tons based on an acceptable 90 percent recovery rate; approximately 18,000,000 tons is estimated loss in the mining process. The 30-year plan required 93,000,000 tons committed to surface mining. It is apparent that this enlarged LMU (to include competitive lease application, which has not been granted at this time, will not be able to extract all the total recoverable reserves in forty years as set forth in the regulations 43 CFR 3520.2-6. Colowyo has also shown intent to submit future underground mining plans to extract coal from four different lower coal beds. Some 100,000,000 tons of recoverable coal could be mined from these seams with present underground mining technology.

Open-pit mining was initiated over the surface of the NW 1/4 of sec. 3, T.3 N., R.93 W. It was first cleared of vegetation and the developed topsoil was removed by wheeled scraper to a designated stockpile area. The first cut in the overburden was drilled with a crawler-mounted drill, blasted with ammonium nitrate fuel oil, and loaded into 120-ton trucks by a 15 cubic yard electric shovel for haulage to the spoil dump area. The exposed "X" seam is drilled with a truck-mounted machine and loaded with a 20 cubic yard front-end loader into 120-ton trucks to the temporary crushing and loadout facility. The crushed coal is transported by highway trucks to the Craig rail loadout.

With the mining of "X" seam advancing in a southwesterly direction, a pit will be opened on the west side in the NE 1/4 of sec. 3, T.3 N., R.93 W. from the top of "X" coal seam to the bottom of "F" coal seam. The pit development will be started by cutting a haul road to the "A" seam overburden, removing this overburden, and then extracting the "A" seam. This will be followed in sequential overburden and coal removal of "B", "C", "D", "E" and "F" seams in descending order using the lower haul road. The same equipment and procedures will be utilized as in mining the "X" coal seam above.

Upon completion of the box cut to the east, the benches will be connected to the previously developed benches of the western area of the pit. The combined pit will then be mined continuously in sequential manner from top to bottom, removing over burden by shovel-truck combination from "Y", "X" and "A" seams, and by dragline from "B" through "F" seams. Spoils will be placed in the mined-out pit.

Subsequent advancement of mining of the eight coal seams will result in an average dimension of the open pit of 6,000 feet in length and approximately 1,900 feet in width from the highwall of the top mast "Y" seams to be reclaimed spoil areas.

Production Capability Analysis

The mining and overburden removal system used at Colowyo is basically a combination of open pit and area strip techniques. Overburden and interburden removal for the 4/5 uppermost coal seams is done by 15 and 25-cubic-yard shovels loading into 120 and 170-ton end-dump trucks. The material is then trucked from the advancing edge of the pit around one end and dumped in a spoil area where the coal has already been mined. This technique results in a moving pit that moves in the direction of the side of the pit where the overburden and interburden are being removed.

The interburden for the bottom-most four coal seams is being removed by draglines located in the bottom of the pit created by the shovels and trucks. Use of draglines for this function is justified because the combined interburden and seam thicknesses for the four bottom-most seams is approximately 125 feet or well within the capability of a longer boomed dragline without requiring significant material rehandle. In this way the extremely low material handling costs typical of dragline operations can be obtained for that overburden material within the normal operating range of a dragline and the somewhat, higher unit costs associated with shovel and truck waste material handling is applied only to that material beyond the operating limits of a dragline.

The 3.0 million tons-per-year production rate planned for obtainment in 1981 will require the extraction of coal from seams covering approximately 50 acres. Similarly, the ultimate production rate of 4.5 million tons-per-year to be obtained in 1984 will require the disturbance of 75 acres of new land. Both of these requirements should be well within the capabilities of the mining system used at Colowyo. The 27 and 37-cubic-yard draglines should be able to handle their production assignments throughout the life of the mine. The shovel and truck teams designated for overburden and interburden removal in the upper portions of the pit and for coal loading and hauling can be augmented if justified by changes in the mining conditions.

Transportation of the coal from the mine to its markets should not provide any problems, Work on unit train load out facilities and a 25-mile long spur to the main line of the Denver and Rio Grande Western Railroad was completed in October 1979. Currently, unit trains of up to 105 cars in length can be loaded and dispatched in less than two hours at any time of the day. The only possible limitation on Colowyo's ability to get its coal to market would be the over capacitating of the main line facilities of the D&RGW as other coal mines in northwestern Colorado come into production.

Diligent Development Analysis

Colowyo is currently mining under an approved mining plan which includes a single lease in the LMU. The estimated reserves on this lease are listed in the mining plan as 165 million tons.

At an assumed surface mining recovery rate of 90 percent, this would result in 148.5 million tons of recoverable coal over the life of the mine. To maintain diligent development and to satisfy the continuous operation requirement they will have to average approximately 3.7 millions of coal production per year over the life of the mine. Given that the production rate will be up to 3.0 million tons per year in the third year of mining and 4.5 million tons per year in the seventh year of mining the company will exceed the requirements for both diligent development and continuous operation.

Colowyo has filed competitive lease application number C-22839. Their intentions in making this application are not entirely clear. However, they included the following statement in a letter to the Office of Surface Mining dated May 15, 1980.

Colowyo is currently having engineering studies prepared to determine the life of the mine plan for the increased production rate. We anticipate that this information will be available for inclusion in Colowyo's permanent program application. However, the increase in production will not require mining outside of the current permitted area until at least 1990, with the exact year dependent upon Colowyo's success in obtaining rights to adjacent unleased federal coal. This coal is currently scheduled for sale in early 1981, and has been applied for by Colowyo as a short-term lease. The expansion of the mine will involve some or all the following: unleased federal coal, state coal, or the western half of Colowyo's existing federal lease.

STATE: Colorado **REGION:** Green River **COUNTY:** Moffat

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Colowyo Coal Mine	Colowyo Coal Co.	D-034365	2544.79	2544.79		S	Approved 8-19-77	4.5

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 152.1

SOURCE: M.P.

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

Continued production of 3.0 tpy is dependent upon an additional competitive coal lease application. Colowyo is currently permitted (No. C-11, 665-2 (FD)) for open pit mining of 4.0 tpy. To expand to 4.5 tpy, a new permit is required.

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Colorado REGION: Green River COUNTY: Moffat

MINE NAME (OR LEASE BLOCK): Colowyo

LESSEE(S) (OR OPERATOR): Colowyo Coal Co.

NUMBER OF LEASES IN BLOCK OR PLAN: 1

MINING METHOD: S

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Y_3, Y_2	X	A_2, A_3	B_1	C	D	E	F
FORMATION	Williams Fork	→	→	→	→	→	→	→
RANK	Bit C & Sb A	→	→	→	→	→	→	→
THICKNESS	7.8'	12.3'	6.7'	5.3'	6.0'	10.1'	6.8'	5.4'
Btu/LB	10,100-10,300	10,553	10,800	10,780	10,727	10,626	10,984	10,903
SULFUR (%)	0.37	0.33	0.4-0.6	0.39	0.33	0.34	0.51	0.57
ASH (%)	5.4	5.4	4.9-8.3	4.6	4.75	6.27	4.03	4.86
MOISTURE (%)	16.6	15.8	15.3-14.7	15.09	14.83	14.45	14.54	14.21
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH	33'	147'	210'	266'	299'	328'	366'	387'
IN-PLACE RESERVES	7.0	34.1	12.9	15.3	20.3	34.2	23.3	17.9
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL			165.0	USGS
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				MINE PLAN
	SURFACE	152.1			
	UNDERGROUND				

NOTES: Plan is to mine B seams, Y_3 & Y_2 will be taken together, same as with A_2, A_3.

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Colorado **REGION:** Green River **COUNTY:** Moffat

MINE NAME OR LEASE BLOCK Colowyo	LESSEE(S) Colowyo Coal Co.	NUMBER OF LEASES 1	DATE MINE OPENED: 1971 PROJECTED CLOSING DATE: 2006 REMAINING MINE LIFE: 26
REMAINING RECOVERABLE RESERVES: FEDERAL: 152.1 NON-FEDERAL:		MINE DESIGN CAPACITY 3.0 RECOVERY RATE: 90	CUMULATIVE PRODUCTION TO 1979: 5.91 1979 ACTUAL PRODUCTION: 1.4 (ACLDS)

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	2.7 ①		
1981	3.0		City of Colorado Springs
1982	3.		14.0 tons over 20 yrs.
1983			
1984	4.5		
1985	↓		
1986			
1987			
1988			
1989			
1990			
Post 1990	72.0		

NOTES: Production problems come from fairly steep slopes, formation variation in dip from 3°-10°, presence of faults, subsidary folding and joint system and alternating hard and soft beds of overburden.

In the future, Colowyo would like to U/G mine several lower seams containing 100 tons recoverable.

① Amendment to mining and reclamation plan 6/80.

All Figures Shown In Million Tons

PRODUCTION SUMMARY

EAGLE MINES NO. 5, NO. 9
(WISE HILL NO. 5, NO. 9)
EMPIRE ENERGY CORPORATION
MAP LOCATION C - 3
FEDERAL COAL LEASES: D056298
C0126480
C0127865
MOFFAT COUNTY, COLORADO

Empire Energy Corporation operates an underground coal mining operation located approximately 7 miles southwest of Craig, Colorado, off State Highway 13.

Property Description	Acres
Federal Coal Lease D056298 in sec. 6, T. 5 N., R. 91 W., Sixth Principal Meridian	41.21
Federal Coal Lease C0127865 in sec. 6, T. 5 N., R. 91 W., Sixth Principal Meridian	43.03
Federal Coal Lease C0126480 in sec. 6, T. 5 N., R. 91 W., in secs. 29 and 30, T. 6 N., R. 91 W., Sixth Principal Meridian	366.51
Total Acreage	450.75

There is also a small amount of Fee lands involved in the mine plan that totals about 50 acres. Empire Energy does have two Federal Coal Lease Applications, C13134 and C21981 planned for future development but are unleased as of this report.

Coal beds to be mined on the subject lease area belong to the lower and upper coal groups of the Williams Fork Formation of late Cretaceous age. The C, E, and F coal seams are mineable in the "lower group" of coals between two prominent sandstone units - the Trout Creek Sandstone and the Twentymile Sandstone Member of the Williams Fork. The P seam is found above the Twentymile Sandstone in the "upper group" of coal bearing formations.

The mine area structure is relatively simple as surface indications show no prominent faults. However, two relatively small faults with throws of less than 40 feet were noted at the surface in secs. 25 and 36, T. 6 N., R. 92 W. They were detected by aerial photographic interpretation and field survey.

The subject leases are located about one mile east of the NNW trending axis of the Williams Fork anticline. Structure contours on the Trout Creek Sandstone indicate that the strata in the leases dip about 8° NNE. Lessee reports a regional dip of 8-1/2° N. 30°E. in sec. 6, adjacent to the subject leases.

ASTM designations indicate the coal from the subject leases is ranked on the borderline between high volatile B and C bituminous coal. Quality information for the above mentioned seams are expressed as a range, reflecting the difference in quality from the different drill holes. Due to the variance, the information on quality is reported within the summary displays.

Recoverable reserves by seam are indicated as follows: C seam: 2,769,705 tons; E seam 2,043,000 tons; F seam 981,000 tons and the P seam 845,000 tons. The recoverable reserves are based upon an average recovery factor of 41 percent.

The existing and approved underground operations for the two mines, the Eagle Mine No. 5 and the Eagle Mine No. 9 are located in two different coal seams in the same geographical area. No. 5 operates the F seam and No. 9 operates the P seam. Empire uses a room and pillar mining method to extract the coal. A continuous miner and shuttle car system is used to cut and haul the coal to belt conveyor systems, which eventually delivers the coal to the surface facilities. Empire, along with the standard room and pillar methods, utilizes a pillar extraction system to optimize resource recovery. Projected annual tonnage for each mine will be 800,000 tons or a total of 1,600,000 tons per year. Plans are to open two new underground mines, No. 6 and No. 7, but currently the plans have not been approved.

Production Capability Analysis

The Empire Energy mining complex is in the process of expanding from a one-mine, 500,000-ton-per-year production rate to a four-mine, 3-million-ton-per-year production rate. The oldest mine in the complex Eagle Mine No. 5, is being expanded from its original rate of 500,000 tons per year to a new rate of 800,000 tons per year. Eagle Mine No. 9 was brought on stream in 1979 and is projected to reach a rate of 700,000 tons in 1980. Eagle Mines No. 6 and No. 7 are planned to begin production in 1981 and 1983, respectively, and reach their full production rates of 750,000 tons per year by 1984. At the present time, however, only the mine plans for five and nine are approved and six and seven are undergoing the approval process.

The mines are located in different seams and will be developed so that the comparable parts of the workings for each mine are located directly above or below those for other mines. No. 9 is located in the top-most P seam, No. 5 in the F seam which is the next seam down to be mined, No. 6 in the E seam and No. 7 in the C seam. All of the seams to be mined are quite thick. The E seam is the thickest at 19 feet and the P seam the thinnest at 15 feet. At the present time the company is not projecting any mining heights above 12 feet as being minable.

At the present time there is some question as to what the recoverable reserves are for each seam. The figures stated earlier

Empire Energy has placed special emphasis on upgrading the facilities for transporting the coal out the mine and to market. The main conveyors out of the mines will be 42-inch belts. These belts deliver the coal to a surface plant where it is run through a breaker unit, screened and stored in a 10,000-ton storage silo. Unit trains are loaded directly from this silo and the coal moved on its way to market.

The only obvious potential environmental problem is that the mines are located under the flood plains of both the Williams Fork and Yampa Rivers and the rail loadout facility for the complex is located 40 feet from the bank of the Williams Fork River. The company has provided for increased pillar spacing and the reduction of the extraction rate from 55 to 40 percent under the flood plains to reduce the potential for subsidence. Whether or not this will be sufficient, only time will tell.

Because the storage silo and associated loadout facilities are located 40 feet from the Williams Fork River at the point where a meander is developing, OSM required the company to undergo considerable extra technical investigation to show that these facilities would not be endangered by the encroaching river during the life of the mine. The company was able to demonstrate this to OSM's satisfaction.

in this analysis, are those submitted to the USGS by Empire Energy in April 1980. It is obvious that the amount of reserves shown for the different seams (13 million tons total) could not support the planned production rates for the mines (3 million tons per year capacity) over the projected mine life. The mine plan also provides some confusing information on the mine reserves. At one point in the mining plan it is indicated that 15 years of reserves have been identified for mines No. 5 and No. 9. At another location in the mining plan there is a table of reserves developed by the John T. Boyd Company and dated January, 1976. This reserves summary shows recoverable reserves ranging from a high of 65,849,000 tons in the C seam to a low of 20,299,000 tons for the P seam. The Boyd reserves estimates cover minable acreage in excess of that identified in the Empire Energy mine permit area. The actual amount of reserves in the Empire Energy leases are consequently difficult to determine.

The planned production rates for the four mines are not unreasonable given the number of entries that have been specified for each. However, the companies stated intent to equip the No. 5 and No. 9 mines with only two continuous miners, and a yet unknown number of miners for No. 6 and No. 7 seems on the low side. This number of miners will only be sufficient if the company is planning on operating at least two shifts a day, seven days a week or three shifts a day, five days a week year round.

Diligent Development Analysis

The question as to whether or not the company will comply with the requirements for diligent development cannot be answered with certainty given the differing estimates of available reserves. The lower numbers provided by the company are unrealistically low and mean that the reserves will be mined out in three or four years' time unless additional reserves are acquired. The high numbers presented in the Boyd table indicate mine lives ranging from approximately 29 years for the No. 9 mine to 88 years for the No. 7 mine.

Even with the uncertainty over the amount of reserves actually contained in the leases, it is quite probable that Empire Energy will be able to satisfy diligent production requirements on the basis of its past and planned production.

STATE: Colorado **REGION:** Green River **COUNTY:** Moffat

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Eagle Mines No.5 and No. 9	Empire Energy Corporation	D056298 C0127865 C0126480	500.75	41.21 43.03 366.51	50	U.G.	Approved	3.0

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 6.639

SOURCE: M. P.

ASSOCIATED LEASES WITH REASONS WHY:
Coal lease applications; C13134, C21981

All Figures Shown in Million Tons

COMMENTS:
Mines 6 and 7 are currently undergoing the approval process.
No reserve data is provided due to widely differing estimates by John T. Boyd Co. and Empire Energy Corp.

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Colorado   REGION: GREEN River   COUNTY: Moffat

MINE NAME (OR LEASE BLOCK): Eagle Mines (#5, #9)

LESSEE(S) (OR OPERATOR): Empire Energy Corporation

NUMBER OF LEASES IN BLOCK OR PLAN: 3

MINING METHOD: UG.

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	C	E	F	P				
FORMATION	Williams Fork							
RANK	Sub Bit							
THICKNESS	13.2' ave	10.8' ave	8.6' ave	8.6' ave				
Btu/LB	9,864 - 11,753	10,679 - 11,155	10,377 - 11,567	10,237 - 10,914				
SULFUR (%)	0.48 - 0.61	0.41 - 0.51	0.46 - 0.57	0.33 - 0.46				
ASH (%)	5.79 - 15.81	5.84 - 9.76	4.99 - 10.36	3.25 - 5.38				
MOISTURE (%)	7.99 - 11.92	7.94 - 13.86	8.93 - 12.84	14.83 - 17.60				
FIXED CARBON (%)	37.49 - 47.29	42.71 - 45.69	41.75 - 51.85	43.89 - 46.92				
VOLATILE (%)	34.91 - 37.60	35.72 - 39.05	35.43 - 38.83	30.97 - 35.23				
SEAM DEPTH	1,350 ave	1,150 ave	1,100 ave	500 ave.				
IN-PLACE RESERVES	162.148	135.261	100.230	50.181				
RECOVERABLE RESERVES	2.780	2.043	0.981	0.845				
RECOVERY RATE	40.6%	42.0%	42.1%	40.3%				

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			6.639	OSM

NOTES:

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Colorado REGION: Green River COUNTY: Moffat

MINE NAME OR LEASE BLOCK: Eagle Mines No.5 and No.9

LESSEE(S): Empire Energy Corporation

NUMBER OF LEASES: 3

DATE MINE OPENED: 10/79

PROJECTED CLOSING DATE: 7/86

REMAINING MINE LIFE: 6

REMAINING RECOVERABLE RESERVES:

FEDERAL: 6.639

NON-FEDERAL:

MINE DESIGN CAPACITY

RECOVERY RATE: 41

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	1.2		
1981	1.35		
1982	1.45		
1983	1.5		
1984	1.5		
1985	1.5		
1986			
1987			
1988			
1989			
1990			
Post 1990			

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

16B, #2

TRAPPER MINE (SURFACE)
UTAH INTERNATIONAL, INC.
MAP LOCATION C - 4
FEDERAL COAL LEASES: C07518
C07519
C079641
C813
MOFFAT COUNTY, COLORADO

The Trapper strip mine, operated by Utah International, Inc., is located in the Yampa coal field in southeastern Moffat County, Colorado. The mine lies along the northern slope of the Willaims Fork Mountains approximately seven miles south of Craig, Colorado.

Utah International, Inc. holds four Federal coal leases, several State coal leases, a County coal lease, and considerable fee land. The following Federal lands are included in the four Federal coal leases:

Property Description	Acres
Federal Coal Lease C07518 is comprised of tracts in secs. 1, 2, 3, 4, 9, and 10, T.5 N., R.91 W., and in sec. 33, T.6 N., R.91 W., Sixth Principal Meridian	2,567.66
Federal Coal Lease C07519 is comprised of tracts in sec. 6, T.5 N., R.90 W., and in sec. 31, T.6 N., R.90 W., Sixth Principal Meridian	1,371.82
Federal Coal Lease C079641 is comprised of tracts in sec. 5, T.5 N., R.90 W., and in sec. 32. T.6 N., R.90 W., Sixth Principal Meridian	1,351.84
Federal Coal Lease C813 is comprised of tracts in sec. 24, T. 6 N., R. 91 W., Sixth Principal Meridian	159.55
Total Federal Acreage	5,450.87

A pending Federal Coal Lease application, C25948, is located in sec. 5, T.5 N., R.91 W., Sixth Principal Meridian and contains 85.26 acres.

The area being mined by Utah International, Inc. at the Trapper mine is underlain by the Upper Cretaceous-age Williams Fork Formation of the Mesaverde Group and lies on the northern flank of a west-northwest plunging anticline. Beds dip to the north about 5° to 10°. Overburden depths range from 20 to 120 feet and average 75 feet within the mine area.

Coal seams which are being actively mined at the Trapper mine include (in ascending order) the "Q", "L", "K", "I", and "H" seams with the "I" or Wadge seam (averaging approximately 11 feet thick) the primary goal. The "K" and "L" seams are of mineable thickness in some areas and are separated by only seven feet of parting.

The coal being mined at the Trapper mine is low sulfur steam coal, and is classified as sub-bituminous in rank. An average proximate analysis for the major coal seams within the lease is:

Moisture	13.78%
Volatile Matter	38.49%
Fixed Carbon	41.92%
Ash	5.81%
Sulfur	0.38%
Btu/lb	10,459

Total Utah International, Inc. lands (including Federal, State, County and fee coal couers approximately 19,400 acres. Approximately 8,300 acres of this will be affected by strip mining and related facilities. About 53,000,000 tons of coal underlie the Federal leases which can be economically recovered by strip mining. The combined Federal, State, County and fee lands contain about 78,000,000 tons of strippable reserves. Production started in 1977 and is scheduled to continue until 2013 with an annual production rate of about 2,300,000 tons per year.

Strip mining activity at the Trapper mine is initiated by brush removal with a dozer and by topsoil removal and stockpiling with scrapers. Overburden is drilled by electric rotary drills, shot electrically using ANFO, and stripped by a 30-cubic yard walking dragline assisted by a dozer.

Coal seams will be exposed in a 100-foot wide dip line cut (strips cut parallel to the downhill dip of the coal seam) beginning at or near the outcrop and progressing down dip to a maximum depth of 120 feet. The dragline advances down dip (to the north) exposing the bottom coal seam until the cropline of the overlying coal seam is encountered. Through a series of off-setting maneuvers, the dragline exposes and moves the upper coal to the highwall where it is loaded by front-end loaders into 50-ton haulage trucks. Additional overburden and coal are removed until the bottom coal seam is fully exposed to permit hydraulic backhoe and rear-dump trucks mining. Some of the coal will require drilling and blasing.

Mining is limited to the economically recoverable coal. In some areas up to three seams may be recovered ("Q", "K" and "L" seams is removed selectively with a backhoe). Seams too thin to mine will be wasted on the spoil pile.

Mining in each area of the mine will follow similar procedures with minor adjustments for different coal seam configurations and topographical conditions. Spoils are usually cast to the mined-out cut beyond the active mining face. Sixty-foot wide, 15 percent grade haulage ramps are cut into the highwall at the outcrop of each seam to facilitate coal haulage to the stockpile or coal hopper area.

Dozers will regrade the boxcut spoils outward from the cut 300 to 500 feet (at a maximum 3 to 1 slope). Topsoil will be redistributed and revegetated. The land will be reclaimed as rangeland and big game habitat. Lower slopes may be reclaimed for dryland crop farming.

The dip line mining method is being used (rather than strike line as proposed previously) because of problems encountered with slope stability and dewatering.

Coal mined from the Trapper strip mine fuels the Colorado-Ute Electric Association coal-fired generations plant located near Craig.

Production Capability Analysis

As indicated above, the Trapper Mine LMU consists of a total of 19,400 acres. The federal acreage is approximately 5,450 acres and the balance is made up of state and fee land. Active mining operations will affect an area 2 by 6 miles or approximately 8,000 acres.

Coal extraction is organized into theee separate pits, each worked by a 30-cubic-year dragline for overburden removal. These pits vary as to both their overall size and the number of seams which are being mined. However, they all are designed to operate with the dragline gradually working its way down the dip slope until the overburden depth for the bottom-most seam reaches 120 feet. In two of the pits the dragline then deadheads back to the tope of the slope, a process that takes three to four days, and begins the down dip process all over again. In the third pit the dragline removes overburden from an upper seam while moving down dip and then removes the interburden from on top of a lower seam while working it way back up dip.

Three years of operating experience has shown that all of the key components of the operation are properly sized relative to each other and the total annual production requirement of 2.3 million tons of coal per year. Each pit is organized so that topsoil has been removed 600 feet or three mining widths in advance of the pit. The 200-width immediately in front of the pit will have been topsoiled, drilled and blasted. The next 200-foot width will have been topsoiled and is in the process of being drilled for overburden blasting. The third 200-foot width is having the topsoil removed.

This interaction among components is even more crucial when scheduling coal mining operations around the overburden removal process. Since the seams are highly variable in both thickness and coal quality it is necessary to have coal loading equipment that is flexible and can selectively mine the coal. Demag backhoes have been used to provide this selectivity from the very inception of mining operations. As has been known in Europe for a number of years, with a backhoe the operator can clearly see the material being excavated and can control the movement of the bucket accordingly. At the Trapper Mine this capability is used to remove shale partings in the coal and to dump them into areas of the pit where the coal has already been removed.

Environmental protection measures in use at the Trapper Mine are typical of those found at all western surface mining operations. This includes segregation of the topsoil for later spreading on top of the leveled spoils, reseeding of the topsoil with plant varieties native to the area and which have shown themselves to be suitable for large aerial seeding, and protection or subsurface and surface hydrologic conditions. The mine is just now hitting its stride in the restoration function where it must deal with the reclamation of 300 acres of disturbed land per year.

Since the Trapper Mine is dedicated to supply coal for a mine-mouth power plant, there is no potential for problems with coal transportation.

Diligent Development Analysis

The Trapper Mine has been designed so that its surface minable reserves will be mined out in 35 years. The mine plan provides for an annual production rate of 2.3 million tons over the first half of the mine life. This figure will then gradually decrease to approximately 1.5 millions tons per year in the latter years of the mine life. Therefore, it is obvious that there should be no concern about the mine meeting the diligent development and continuous operation requirements.

STATE: COLORADO **REGION:** GREEN RIVER **COUNTY:** MOFFAT

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
TRAPPER	UTAH INTERNATIONAL, INC.	C07518	8200	2567.66	13,950	S	Approved 10-18-77	2.8
		C07519		1371.82				
		C079641		1,351.89				
		C813		159.55				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 78.0

RECOVERABLE: 62.4

SOURCE: IC

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:
PENDING FEDERAL CLA C 25948 (85.26 Acres)

COMMENTS: C813 IS NOT INCLUDED IN RESERVE ESTIMATE, THE LEASE CONTAINS 18.117 tons RESERVES

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: GREEN RIVER COUNTY: MOFFAT

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
TRAPPER	UTAH INTERNATIONAL, INC.	4	S

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	H	I (WADGE)	K	L	Q			
FORMATION	WILLIAMS FORK	WILLIAMS FORK	WILLIAMS FORK	WILLIAMS FORK	WILLIAMS FORK			
RANK		Sub bit.						
THICKNESS		11'			8'-10'			
Btu/LB		10,459			9,997			
SULFUR (%)		0.38			0.29			
ASH (%)		5.8			7.49			
MOISTURE (%)		13.8						
FIXED CARBON (%)		41.9						
VOLATILE (%)		38.5						
SEAM DEPTH		150'						
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE	62.4	25.032	87.432	1C
	UNDERGROUND				

NOTES: I (WADGE) SEAM IS MOST MINEABLE, QUALITY DATA FOR H SEAM INDICATED TO BE SIMILAR TO THE I SEAM. THEY WILL BE MINING ALL 5 SEAMS

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO REGION: GREEN RIVER COUNTY: MOFFAT

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	
TRAPPER	UTAH INTERNATIONAL, INC.	4	DATE MINE OPENED: 1977 PROJECTED CLOSING DATE: 2016 REMAINING MINE LIFE: 33-38

REMAINING RECOVERABLE RESERVES:
FEDERAL: 62.9 ①
NON-FEDERAL: 25.032

MINE DESIGN CAPACITY 2.8
RECOVERY RATE: 90

CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION: 2.0

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	2.0		COLORADO UTE ELECTRIC 1.8 T/y
1981	2.1		
1982	2.3 ↓		TOTAL UTILITY COMMITMENT
1983			4.9 T/y
1984			
1985			
1986			
1987			
1988	2.3		
1989	2.3		
1990	2.3		
Post 1990	44.664		

NOTES: ① C813 RESERVES INDICATED TO BE 18.117 TONS, NO BREAK DOWN INDICATED.

All Figures Shown In Million Tons

PRODUCTION SUMMARY

20B, #2

PROPOSED CRAIG UNDERGROUND MINE
UTAH INTERNATIONAL, INC.
MAP LOCATION C - 4
FEDERAL COAL LEASE: C07518
C07519
C079641
C813
MOFFAT COUNTY, COLORADO

Utah International, Inc. has proposed opening an underground coal mine which will be located mainly in T.5 N., R.91 W., Sixth Principal Meridian, about 8 miles south of Craig, Colorado. The proposed mine (Craig underground mine project) will lie along the southern slope of the Williams Fork Mountains in the Yampa coal field of southeastern Moffat County.

The proposed mine will extract coal resources that are too deep to recover through the current Utah International, Inc.'s stripping operation at the Trapper mine. Utah International, Inc. holds four Federal coal leases (totaling 5,450 acres), several State coal leases, a County coal lease, and considerable fee land in T.6 N., R.90 W.; T.6 N.; T.6 N., R.91 W.; T.5 N., R.90 W.' and T.5 N., R.91 W., Sixth Principal Meridian, the site of the Trapper strip mine. A pending Federal coal lease application (C25948) is also located in T. 5 N., R. 91 W. These Federal coal leases are included in the Trapper strip mine description.

The proposed mine area is underlain by the Upper Cretaceous-age Williams Fork Formation of the Mesaverde Group and lies on the northern flank of a west-northwest plunging anticline. Beds dip to the north-northwest at 5° to 10°.

The Williams Fork Formation is approximately 1,700 to 1,800 feet thick in the proposed mine area and consists of alternating sandstone, sandy shale, carbonaceous shale and coal beds. A thick (100- to 200-foot) white sandstone known as the Twenty Mile Sandstone member separates the Williams Fork Formation into a lower coal-bearing zone (the lower Williams Fork) from a thinner overlying zone of coal beds known as the upper Williams Fork. The lower Williams Fork coal zone, containing the target coal seam for the proposed underground mine, is located about 300 feet above the base of the formation and 800 feet below the Twenty Mile Sandstone. Five coal seams in the upper coal zone are being mined at the Trapper surface mine.

A major drilling program that occurred from 1974 to 1976 (to evaluate the underground reserves in the Williams Fork Formation) indicates three seams in the lower Willaims Fork zone might be mineable. These are, in ascending order, the "GE", the "DE" and the Hart coal seams. The "DE" coal seam will be mined in the proposed underground mine since it is generally continuous and clean, and has a fairly competent roof of sandy shale, shale, or sandstone. The overlying Hart coal seam is unmineable because it is very lenticular and erratic. It also has a roof rock (shale mixed with coal) and a floor rock (shale) that are unsuitable for mining. The Hart coal seam lies under approximately 400 to 580 feet of overburden.

Analysis of the coal quality of the "DE" seam indicates the following:

Moisture	14.5 to 17.5%
Volatile matter	approximately 34%
Fixed carbon	approximately 45%
Ash	5.7 to 6.0%
Btu/lb	10,100 to 10,500

A preliminary estimate of reserves in the "DE" coal seam indicates that in-place reserves are 29,400,000 tons with approximately 17,300,000 tons recoverable (at a 58.5 percent recovery rate). Annual production is estimated to be 1,230,000 tons over a 20 year mine life with the ability to expand to a higher rate.

The proposed underground mine would use continuous miners for room and pillar extraction. Access to the coal would be through four adits or entries from the outcrop on the south side of the Williams Fork Mountains. Surface facilities would be located adjacent to the entries with an access road connecting the underground mine to the Trapper surface mine facilities and railroad transportation.

Mine development would consist of driving two sets of five entries (or parallel mains) with a 200-foot wide barrier pillar between the two sets of mains. The mains would be advanced 2,000 feet where panel development would begin. Panels would be mined on retreat with about 79 percent panel recovery. Coal would be transported from the face by shuttle cars to a conveyor belt to the surface. Fifty-ton haulage trucks would transport the coal to the mine stockpile at the railroad loadout facility used by the Trapper surface mine.

STATE: Co **REGION:** GREEN RIVER **COUNTY:** MOFFAT

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
PROPOSED CRAIG UNDERGROUND MINE (TRAPPER)	UTAH INTERNATIONAL INC.	C-07518		2,567.66		U/G		1.23
		C-07519		1371.82				
		C-079641		1,351.84				
		C-813		159.55				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 29.4

RECOVERABLE: 17.3

SOURCE: LESSEE

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:
C-25948 PENDING LEASE APPLICATION CONTAINING 85.26 ACRES

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Co REGION: GREEN RIVER COUNTY: MOFFAT

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
PROPOSED CRAIG UNDERGROUND MINE	UTAH INTERNATIONAL INC.	4	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	"GC"	"DE"	HART					
FORMATION	WILLIAMS FORK	WILLIAMS FORK	WILLIAMS FORK					
RANK	SUB-BIT	SUB-BIT	SUB-BIT					
THICKNESS								
Btu/LB		10,100-10,500						
SULFUR (%)								
ASH (%)		5.7-6.0						
MOISTURE (%)		14.5-17.5						
FIXED CARBON (%)		45						
VOLATILE (%)		34						
SEAM DEPTH			400'-580'					
IN-PLACE RESERVES		29.4						
RECOVERABLE RESERVES		17.3						
RECOVERY RATE		58.5%						

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			29.4	MINE
RECOVERABLE:	TOTAL				PLAN
	SURFACE				
	UNDERGROUND			17.3	

NOTES:

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Co **REGION:** GREEN RIVER **COUNTY:** MOFFAT

MINE NAME OR LEASE BLOCK: PROPOSED CRAIG UNDERGROUND MINE

LESSEE(S): UTAH INTERNATIONAL, INC.

NUMBER OF LEASES: 4

DATE MINE OPENED:

PROJECTED CLOSING DATE:

REMAINING MINE LIFE: 20 YEARS

REMAINING RECOVERABLE RESERVES:

FEDERAL: } 29.4

NON-FEDERAL: }

MINE DESIGN CAPACITY 1.23

RECOVERY RATE: 58.5

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:		TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	1992-1995 START DATE	0.38 (1)		
1981		1.17		
1982		1.23		
1983		1.23		
1984		1.23		
1985		1.23		
1986		1.23		
1987		1.23		
1988		1.23		
1989		1.23		
1990		1.23		
Post 1990		4.68		

NOTES: (1) PROJECTED

All Figures Shown in Million Tons

PRODUCTION SUMMARY

19A, #3

DESERADO MINE

WESTERN FUELS ASSOCIATION, INC.
MAP LOCATION C - 5
FEDERAL COAL LEASES: C023703 (2,557.22 Acres)
D047201 (513.00 Acres)
RIO BLANCO COUNTY, COLORADO

The Deserado Mine is proposed on the Moon Lake Electric lease, C023703, and the Reliable Coal and Mining Company lease, D047201. The mine site is located approximately nine miles northeast of Rangely, Colorado, two to three miles north of State Highway 64. In the Lower White River coal field it is on the north bank of the Scullion Gulch.

The coal seams of interest, the "B", "C", and "D" seams are located in the Mesaverde Formation of Upper Cretaceous age. The "D" seam, the upper most mineable seam averages seven and one-half feet in thickness and is mineable throughout both leases. The "B" seam is mineable in all of the lease D047201 and only in the western portion of C023703. The B/C seams combined are mindable only in the easetern portion of C023703. The B and C seams were previously mined in the Staley and Gordon Mines. Coal reserves for the various seams are summarized below.

COAL RESERVES (in tons)

Area	Seam	In-Place	Recoverable	Clean
Moon Lake Lease	D	29,550,000	14,182,000	12,055,000
C023703	B-B/C	24,690,000	9,940,000	7,455,000
Reliable Lease	D	6,360,000	3,070,000	2,601,000
D047201	B/C	5,750,000	3,730,000	2,984,000
TOTAL	D	35,910,000	17,252,000	14,656,000
	B-B/C	30,440,000	13,670,000	10,439,000
GRAND TOTAL		66,350,000	30,992,000	25,095,000

The composite analyses for the identified mineable reserves are shown in the table below. These analyses represent the expected run-of-mine (ROM) coal characteristics.

Item	D-Seam	B-B/C Seam
Ash %	13.57	18.11
Sulfur %	0.42	0.41
Heat Value (BTU/lb)	10,141	9,484

Coal of this quality is ranked subbituminous and is utilized as steam coal. The ROM coal will be cleaned in a coal cleaning plant to obtain the following coal quality.

Moisture	12 percent
Ash	10-12 percent
Sulfur	0.50 percent
Heat Value	10,500 BTU/lb.

The mining plan generated for the Deserado mine is based upon mining the D, B, and B/C seams. The D seam, which is the uppermost mineable seam, averages about 7.5 feet thick and is mineable throughout the two coal leases. This seam will be mined by both longwall and room and pillar mining methods. The lower B seam has a mineable thickness in only the west portion of lease C023703 and all of lease D047201. This will also be mined by both longwall and room and pillar methods. The B/C seam, which is present in the eastern portion of lease C023703 will be mined by the longwall method. The coal seams will be accessed by rock tunnels at two locations within the Portal area. The "D" Portal will be developed first and the "B" Portal will be developed approximately ten years later. The raw coal production from this mine will be approximately 1,800,000 tons per year. This allows for a maximum planned delivery of approximately 1,353,000 tons of clean coal to the power plant.

The "D" seam portal consists of two rock tunnels: one two-compartment tunnel and one single-compartment tunnel. The two-compartment tunnel will be divided by a steel and shotcrete divider. The upper compartment will contain the coal conveyor belt, and the lower compartment will contain an inclined track for transportation of men and materials. The single-compartment tunnel will be used for ventilation and to provide a secondary escapeway. These tunnels will be driven N. 17° E. until the coal seam is intercepted. Once in the coal, bottom development will begin, during which the number of entries being driven will be gradually increased from two to eight. This set of eight entries (the West Mains) will be driven about 4,600 feet to the northern boundary of lease C023703.

The "B" seam portal will be west of the "D" portal and of the same design. The only difference will be the length of the rock tunnels.

Based upon the expected mining conditions, which were determined from information derived by extensive exploration drilling, continuous room and pillar and longwall mining systems were chosen as the systems that will result in the greatest recovery of the coal reserves from the Deserado mine in the safest and most economical manner.

In the room and pillar mining areas continuous miners will be used to drive parallel openings in the coal which are called entries or rooms. At specified intervals, crosscuts will be driven to connect the entries. The anticipated mining conditions will require that rooms and crosscuts be driven on 100-foot centers and be 16 to 22 feet wide. The remaining coal pillars will be approximately 80 feet square. The coal will be cut from the face and loaded by the continuous miner into shuttle cars. The shuttle cars will carry the coal to the nearest belt conveyor, which will deliver the coal to the surface.

In the longwall mining areas, the panels outlined during the development will be extracted by the use of rotating drums with attached cutting tools, known as a shearer, that will be forced ataninst the coal hydraulically. The shearer will be moved laterally across the face as well. The broken coal will fall onto an armored conveyor which will transport the coal along the face to the belt conveyor. Roof supports will be maintained in the immediate face area by the use of hydraulically powered, self-advancing supports, called chocks or shields.

As mining progresses, the roof over the mined area will be allowed to cave directly behind the roof support equipment.

Initial mining of coal will begin from the portal in the D seam. Starting in the fourth quarter of 1983, two continuous miner units will begin developing the West Mains. The West Mains consist of 8 parallel entries, each 18 feet wide on 100-foot centers. These will be driven in a N. 17° E direction for about 1,600 feet, at which point the miners will begin driving the five-entry North Submains due east. The continuous miners are scheduled for two 8-hour shifts per day, five days per week.

Initial production from the first longwall will occur in March, 1986, at a rate of 1,200 tons per day (tpd). The daily production will increase gradually until a rate of 2,650 tpd is achieved by the end of the panel in the third quarter of 1987. The longwall equipment will operate for two 8-hour shifts per day, five days per week.

A certain amount of subsidence of the ground surface is expected to occur over those areas that have been mined. The amount of subsidence and the time period over which it occurs depends to a large extent on the method of mining.

Longwall mining will produce the most subsidence principally because of greater resource extraction. This method frequently extracts more than 80 percent of the total resource. Subsidence associated with longwall mining is also a more immediate occurrence.

Room and pillar mining will have a very minimal initial subsidence, .025 feet or less. This is because of the smaller resource extraction and the use of support pillars. Room and pillar mining generally recovers approximately 50 percent of the total resource, leaving behind a considerable number of coal pillars. When pillar recovery is utilized upon retreat from an area resource recoveries begin to approach those of longwall mining which can also result in surface subsidence similar in magnitude to that produced by the longwall method.

The ROM coal will be transported out of the mine portal on a 48-inch conveyor belt. A series of conveyors will then be used to transport the coal through the various storage and preparation facilities.

The mine will provide fuel for a 400 MW power plant to be located either near Bonanza, Utah or near Rangely, Colorado.

STATE: COLORADO **REGION:** GREEN RIVER **COUNTY:** RIO BLANCO

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
DESERADO	WESTERN FUELS ASSOCIATION, INC.	C023703		2557.22		U/G	SUBMITTED M.P.	1.8
		D047201		513.0				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 66.35

RECOVERABLE: 30.992

SOURCE: M. P.

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

C028875

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: GREEN RIVER COUNTY: RIO BLANCO

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
DESERADO	WESTERN FUELS	2	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	B	C	D [1]					
FORMATION			MESAVERDE					
RANK			Sub bit					
THICKNESS			7.5'					
Btu/LB			11070					
SULFUR (%)			0.4					
ASH (%)			4.9					
MOISTURE (%)			32.0					
FIXED CARBON (%)			45.3					
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			66.35	
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			30.992	MINE PLAN

NOTES: 1 SOURCE : ACLDS

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO REGION: GREEN RIVER COUNTY: RIO BLANCO

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	DATE MINE OPENED: 1984 PROJECTED CLOSING DATE: REMAINING MINE LIFE: 20
DERERADO	WESTERN FUELS	2	

REMAINING RECOVERABLE RESERVES:

FEDERAL: 30.992

NON-FEDERAL:

MINE DESIGN CAPACITY 1.8

RECOVERY RATE: 80

CUMULATIVE PRODUCTION TO 1979: –

1979 ACTUAL PRODUCTION: –

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			UTILITY, NOT SURE WHICH
1982			
1983			
1984	0.125		
1985	0 468		
1986	0.786		
1987	1.056		
1988	1.356		
1989	1.356		
1990	1.356		
Post 1990	17.628		

NOTES: LONG WALL

All Figures Shown in Million Tons

PRODUCTION SUMMARY

MEEKER AREA MINES
(RIENAU NO. 2 AND NORTHERN NOS. 1-3)
NORTHERN COAL COMPANY
MAP LOCATION C- 6

FEDERAL COAL LEASES:	D044240	(160.00 Acres)
	C076713	(320.00 Acres)
	C1545	(896.07 Acres)
	C28358	(886.16 Acres)
	C28359	(1,000.00 Acres)

PREFERENCE RIGHT LEASE APPLICATION C0126999
RIO BLANCO COUNTY, COLORADO

The Meeker Area Mines site lies 8 miles north of the town of Meeker (population 2,300 (Young, 1979)) along Curtis Creek, a perennial stream (in the mine plan area) and tributary of the White River. The mine plan area occupies the north-facing slopes of the Rattlesnake Mesa, which comprises the southern limit of the Danforth Hills in the Meeker area. The proposed project consists of four underground mines, each to enter a coal seam at a different elevation and involves 4,750 acres.

The four mines consist of the Northern No. 1 (FF seam), Northern No. 2 (P seam). Northern No. 3 (J seam) and Rienau No. 2 G seam). The Northern No. 1 and Rienau No. 2 mines are presently producing coal on private and Federal leases under Colorado Mine Land Reclamation Board Permit Nos. 79-9 and 34-5, respectively.

Coal seams and the encompassing sedimentary rocks to be affected during the underground coal mining by Northern Coal Company occur in upper Cretaceous age rocks of the Williams Fork Formation. Structurally, the mining area is confined to the Sulfur Creek syncline which represents the northern terminus of the Grand Hogback monocline and the Danforth Hills anticline and coalfield. A few thin coals are present in the underlying Iles Formation, however, they are quite dirty and not of commercial significance.

Dips of the stratum and of the G, J, P, and UP seams range from 18° to the north at the Rienau No. 2 (G seam) mine to about 12° to the west of north along Aicher's Draw near the eastern boundary of the proposed permit area. North of the Rienau No. 2 (G seam) mine, toward the axis of the syncline, dips tend to shallow, becoming almost level, eventually reversing dip direction north of the synclinal axis.

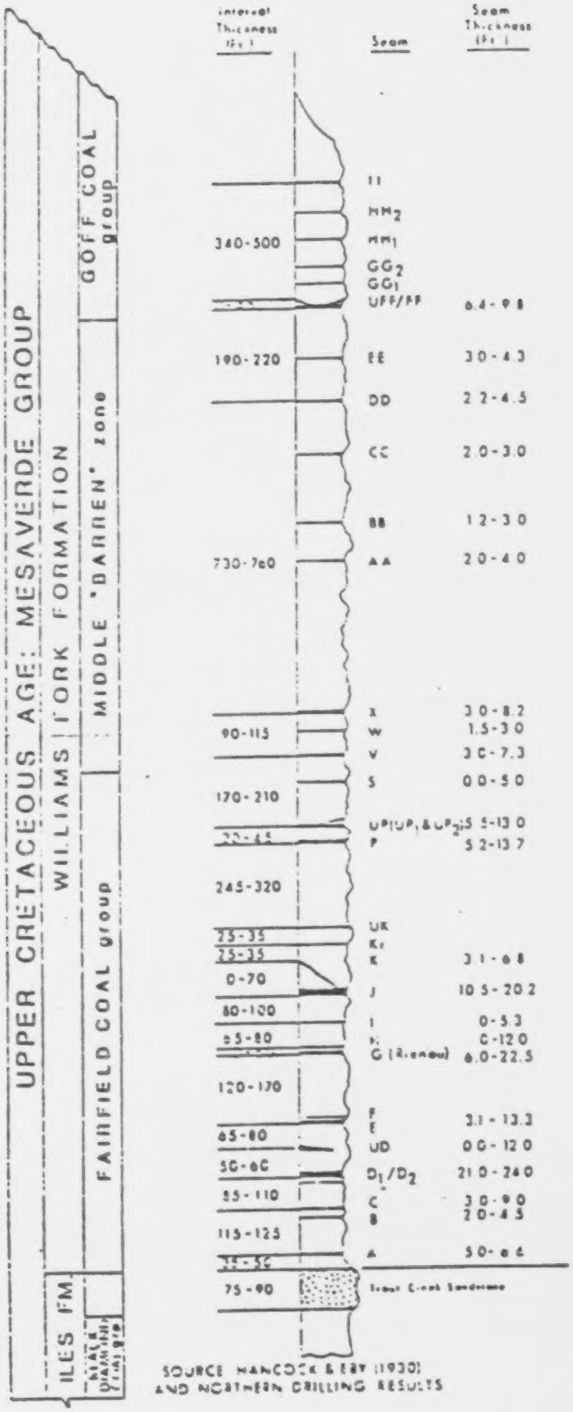
Following three years of exploration drilling and mapping, Northern Coal Company has established seam correlations and identification based on the English alphabet. Figure 1 is a stratigraphic column of the Williams Fork Formation within the mine plan area showing the seam stratigraphy as used by Northern Coal Company. Two seams are currently being mined, the G seam at the Rienau No. 2 (G seam) mine and the FF seam at the Northern No. 1 (FF seam) mine.

G Seam

Stratigraphically, the lowest coal bed planned for mining is the G seam. The bed ranges in thickness from a maximum of 22 feet at the Rienau No. 2 (G seam) mine to about 6 feet near the northeast corner of Federal lease C28358. Near the midway point in the seam height, the coal bed is characterized by a parting of extreme variable lithology and thickness. The parting is present in the seam across the entire property, but nowhere does it exceed 1.1 feet and is usually less than one-half foot in thickness. Correlation of drilling results indicates the G-seam bed thins and splits into several minor coal beds less than 2 feet thick in the southern half of Federal PRLA C0126999. Along its outcrop across the entire property the seam is extensively burned and has been removed by erosion over all except the extreme northern border of lease C28359.

J Seam

The J seam is the next succeeding coal above the G seam that is planned for mining. The G-seam coal bed varies from 130 to 190 feet below the J seam, however, along the northern border of the private coal lands the separation is about 60 feet. This may be due to local faulting outside the permit area or stratigraphic thinning. Characteristically,


UPPER CRETACEOUS AGE: MESAVERDE GROUP
WILLIAMS FORK FORMATION
ILES FM.
GOFF COAL group
MIDDLE "BARREN" zone
FAIRFIELD COAL group
Interval Thickness (Ft)
Seam
Seam Thickness (Ft)
II
HH2
HH1
GG2
GG1
UFF/FF
6.4-9.8
340-500
190-220
EE
3.0-4.3
DD
2.2-4.5
CC
2.0-3.0
BB
1.2-3.0
730-760
AA
2.0-4.0
X
3.0-8.2
90-115
W
1.5-3.0
V
3.0-7.3
S
0.0-5.0
170-210
UP(UP1 & UP2)
5.5-13.0
P
5.2-13.7
245-320
UK
25-35
Kr
25-35
K
3.1-6.8
0-70
J
10.5-20.2
80-100
I
0-5.3
H
0-12.0
G (Riland)
6.0-22.5
120-170
F
E
3.1-13.3
65-80
UD
0.0-12.0
50-60
D1/D2
21.0-24.0
85-110
C
3.0-9.0
B
2.0-4.5
115-125
A
5.0-6.6
75-90
Trout Creek Sandstone

SOURCE HANCOCK & EBY (1930) AND NORTHERN DRILLING RESULTS

Northern Coal Company

Suite 300
760 SO. COLORADO BLVD.
DENVER, COLORADO 80222

FIGURE F-1
COAL SEAM STRATIGRAPHIC COLUMN
MEEKER MINE COMPLEX
RIO BLANCO COUNTY, COLORADO

	J. Swart	3-10-80	ME-8223-07 (eff)
APPROVED BY	DRAWN BY	DATE	FILE NUMBER

Figure 1

the J seam is quite thick ranging from 10 to 35 feet, averaging about 14 feet. The J seam is thickest under the eastern one-half of the mine plan area where the overlying X seam appears to merge with the J seam.

P and Upper P (UP) Seams

Approximately 1,040 feet above the Trout Creek Sandstone, the P seam and UP seams are present in a stratigraphic interval of about 50 feet. The lower and laterally persistent coal bed is the P seam. It ranges from 5 to 14 feet in thickness and is characterized by an apparent "dirty" interval in the lower half of the bed consisting of several carbonaceous shale partings or bony coal splits about 1-foot or greater in thickness. The P seam attains its maximum thickness under the eastern portion of the mine plan area; to the west it becomes increasingly "dirty" and thins to near 6-1/2 feet at its projected subcrop along Curtis Creek.

FF Seam

The FF seam is stratigraphically the uppermost coal bed planned for mining. It is also the thickest and stratigraphically lowest coal bed in the Goff Coal group. It occurs approximately 2,200 feet above the base of the Williams Fork Formation and about 1,200 feet above the P seam and Upper P seam, the next lower seams planned for mining. Thickness of the FF-seam coal ranges from 7 to 10 feet, averaging approximately 9 feet. Locally, greater thickness ranges do occur, resulting from merging of coal beds, drag folding, structural rolls and bed repetition where association with faulting occurs. Depth of cover above the seam at the Northern No. 1 (FF seam) mine ranges from 150 feet to a maximum of 583 feet. The coal quality data for this seam and the other three seams to be mined is shown in the following table.

QUALITY ANALYSIS (As received)

	FF	P	J	G
Heat Value (Btu/lb)	10,373	11,023	11,356	11,055
Sulfur %	0.33	0.26	0.45	0.42
Ash %	4.76	3.62	3.91	7.42

	FF	P	J	G
Moisture %	18.07	15.40	12.95	11.64
Fixed Carbon %	45.85	49.62	47.92	4.75
Volatile Matter %	31.58	31.55	35.42	34.33
Thickness (feet)	9	9	14	6-22
Recovery Factor %	60	59	34	41

Minor faulting involving the FF seam at the Northern No. 1 (FF-seam) mine is present in a subparallel pattern near the axis of the syncline in secs. 20 and 21. Faulting is classified as normal with a left-lateral component of slip most commonly less than 10 feet nowever, larger offsets do occur locally. A high angle reverse fault with a maximum displacement of 40 feet was encountered in another drill hole while elsewhere along the fault throws of 10 feet or less are indicated.

Northern Coal Company intends to mine, via subsurface mining methods 83,300,000 tons of high volatile bituminous B-rank coal from five seams within the Williams Fork Formation. Approximately 4,800,000 tons will be Federal lease coal.

The mine plan for the Northern No. 1 (FF seam) mine has a projected life of 17 years with production continuing until 1997.

The permit area term will be for a period of 5 years from date of approval with an area of 204 acres to be mined. A total of 560 acres of coal will be mined during the life of the mine.

Coal will be mined from the FF seam using the room and pillar method. In this method entries and crosscuts are mined leaving pillars of coal for roof support. Entries and crosscuts will probably be mined on 80-foot x 80-foot centers, 20 feet wide, with a height equal to the seam thickness. After a panel is developed, the remaining pillars will be recovered to such an extent as to maximize recovery while insuring the safety of employees.

The continuous miner will cut the coal from the face and load it into shuttle cars. The shuttle cars will haul the coal to the dumping point and dump the coal into a feeder-breaker. Here the coal is broken to an 8-inch size and fed onto a conveyor belt to be taken outside to the coal handling facilities.

Mining in the Northern No. 2 (P seam) mine is expected to cover 20 years and is planned to start production in 1981. The total of 1,910 acres will be mined during the life of the mine. The permit area term will be for a period of 5 years from the date of approval and will cover an area of 452 acres.

Coal will be mined from the P seam and Upper P seam using continuous miners. Mining will be by the room and pillar method whereby entries and crosscuts are mined leaving pillars of coal for roof support. After each panel is developed, secondary or retreat mining is used. Total coal production from both seams is forecast to be 16,200,000 tons over the projected 20 year mine life.

It is anticipated that entries, rooms and crosscuts will be mined 20 feet wide and on 100-foot x 100-foot centers. Mining height will be the entire seam height up to 12 feet which is the maximum mining height. The Northern No. 2 (P seam) mine will have five continuous miner units. A longwall mining unit may be installed if further geological testing shows that the seam is more uniform than present knowledge indicates.

All development and secondary mining in the Northern No. 2 (P seam) mine will be in advance of the Northern No. 3 (J seam) mine as to not destroy the mining integrity of the P seam. Entries, crosscuts, rooms and barrier pillars in the Northern No. 2 (P seam) mine will be laid out in a manner as to directly overlie in the J seam to every extent practical.

The Northern No. 3 (J seam) mine will have an expected life of 26 years, planning has it to commence in the fourth quarter of 1981 and expiring in the first quarter of 2006.

A total of 2,567 acres will be mined during the life of the mine. The permit area term is for a period of 5 years from the date of approval and will have an area of 442 acres.

Continuous miners will mine using the room and pillar method whereby entries and crosscuts are mined, leaving pillars of coal for roof support. After a panel is developed, secondary or retreat mining is used. In this method, the remaining pillars are recovered to such an extent as to maximize recovery while insuring safety of the employees. Longwall mining involves complete extraction of a block of coal 400 feet to 600 feet wide and 2,000 feet to 5,000 feet long. As the coal is mined, the roof caves behind. Development for the longwall is done with continuous miners.

In the Northern No. 3 (J seam) mine, longwall mining will be utilized to its fullest extent because of present day mining technology and economics preclude double coal benches. Room and pillar mining will be used for all development work and in areas not particularly suitable for longwall mining.

The Rienau No. 2 (G seam) mine has an expected mine life of 29 years. The permit area term is for a period of 5 years following permit approval and will have a mined acreage of 602 acres. For the life of the mine 2520 acres are projected to be mined.

The Rienau No. 2 (G seam) mine presently has one continuous miner unit operating. A second continuous miner unit will be added in 1980 and a longwall unit is scheduled to go into operation in January, 1992.

Continuous units will use the room and pillar method whereby entries and crosscuts are mined leaving pillars of coal for roof support.

After a panel is developed, the remaining pillars are mined to an extent as to maximize recovery while ensuring employee safety.

The continuous miner cuts the coal from the face and loads it into shuttle cars. The shuttle cars haul the coal to the dumping point and dumps the coal into a feeder-breaker. Here the coal is broken to an 8-inch size and fed onto a conveyor belt to be carried out of the mine to the coal handling facilities.

All mining activities at the Northern No. 2 (P seam) and Northern No. 3 (J seam) mines will be kept in advance of the Rienau No. 2 (G seam) mine so as not to destroy the integrity of those upper seams. Crosscuts, entries, rooms and barrier pillars in the G seam mine plan will be columnized with the mine projections of the upper seams to every extent practical.

The reclamation plan outlines the surface restoration and revegetation procedures for the areas that will be disturbed by the construction of a refuse waste disposal pile, road constuction, sedimentation pond and associated hydrologic control structures, and topsoil stockpiles.

Source: Northern Coal Company's Permit Application for Meeker Area Mines and Associated Facilities, June, 1980.

Production Capability Analysis

The Northern Coal Company has revised its plans for its Meeker leases considerably in the past two years. What was originally planned to be a 2-mine LMU with annual production just exceeding 1 million tons per year by 1987 has now become a 4-mine complex with a combined annual production rate of 3.5 million tons in 1984 and over 4.2 million tons in 1992.

As described above, the revised plan is based upon each of four mines extracting the coal from a particular seam on Northern's Meeker Area leases. The annual production rates will range from a low of approximately 400,000 tons per year for Northern #1 to a high of over 2,000,000 tons per year for Northern #3. The projected maximum production rates and estimated recoverable reserves are summarized in the following table:

Mine	Maximum Production Rate	Year Obtained	Recoverable Reserves
Northern #1	400,000	1980	6,800,000
Northern #2	1,000,000	1984	16,800,000
Northern #3	2,010,000	1984	45,300,000
Rienau #2	1,740,000	1992	36,000,000

The estimates of recoverable reserves given in the above table are probably high. They were obtained by taking the company's stated production rates for the different mines and multiplying them by the number of years of planned life for the respective mines. This approach does not allow for year to year variations in the production rates nor for a decreasing production rate in the latter years of the mine life as is typical of many mines.

Mining conditions for the Meeker Area mines appear to be average or above average. However, the sequencing of operations for the different mines to ensure that the coal in lower seams is not extracted before that in overlying seams could result in production problems In the event that production on the lower levels did get ahead of schedule, the resulting subsidence could prevent recovery of the coal from the upper seams.

The recovery rates for the mines could be increased significantly through the proper application of thick-seam mining techniques. The company is planning for a typical mining thickness of 9 feet. This would be a very respectable figure for many underground coal operations, however, ocnsidering that the seams range up to 30 to 40 feet in thickness at some locations on the Meeker Area complex it would seem that considerable quantities of coal will be left in place after mining.

Transportation of coal from the tipple to the nearest rail loadout facility will continue to be an item of some concern and additional cost. Currently, coal is trucked 38 miles one way to the Wilson-Loudy rail loadout which serves the Colowyo Mine. Northern Coal is planning on replacing this arrangement with a 20-mile one way haul to a new Milk Creek rail loadout which is to be in service in 1983 or 1984. Considering the annual quantities of coal which are to be produced from the Meeker Area mines and the fact that this situation will continue well underground coal operations, however, considering that the seams range up to 30 to 40 feet in thickness at some locations on the Meeker Area complex it would seem that considerable quantities of coal will be left in place after mining.

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There are no significant environmental problems that will be caused by the continued expansion of the Meeker Area complex. Ground subsidence could have had an impact on state highway 13/789, creeks in the area, and some of the ranch structures. However, the company is aware of this potential danger and has planned its mining operations and secondary recovery activities to minimize the possibility of harmful subsidence.

Diligent Development Analysis

If the company is able to continue with its current development activities and reach the planned production rates on schedule, then it will meet the diligent development and continuous operation requirements. However, the plans for the Northern #3 and Rienau #2 Mines due do not leave much of a margin for error with respect to being in full production by 1986 and having the recoverable reserves mined out within a 40-year period.

STATE: Colorado **REGION:** GREEN RIVER **COUNTY:** RIO Blanco

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Meeker Area Mines (Rienau No.2 and Northern Nos. 1-3)	Northern Coal Co.	DO 44240		160.00		U/G	Approved	4.8
		CO 76713	4750	320.00				
		C 1545		896.07				
		C 28358		886.16				
		C 28359		1000.00				
				3262.23				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE:

SOURCE:
Mine Plan

All Figures Shown In Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Colorado REGION: GREEN RIVER COUNTY: Rio Blanco

MINE NAME (OR LEASE BLOCK): Meeker Area Mines

LESSEE(S) (OR OPERATOR): Northern Coal Co.

NUMBER OF LEASES IN BLOCK OR PLAN: 5

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	G	FF	J	P				
FORMATION	Williams Fork	→	→	→				
RANK	hv B Bit	→	→	→				
THICKNESS	6'-22'	9'(ave)	14'(ave)					
Btu/LB	11,055	10,373	11,356	11,023				
SULFUR (%)	0.42	0.33	0.45	0.26				
ASH (%)	7.42	4.76	3.91	3.62				
MOISTURE (%)	11.64	18.07	12.95	15.40				
FIXED CARBON (%)		45.85	47.92	49.62				
VOLATILE (%)	34.33	31.58	35.42	31.55				
SEAM DEPTH		150'-583'						
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND	4.8	78.5	83.3	Mine Plan

NOTES:

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Colorado **REGION:** GREEN River **COUNTY:** Rio Blanco

MINE NAME OR LEASE BLOCK Meeker Area Mines	LESSEE(S) Northern Coal Co.	NUMBER OF LEASES 5	DATE MINE OPENED: PROJECTED CLOSING DATE: } ① REMAINING MINE LIFE:

REMAINING RECOVERABLE RESERVES:

FEDERAL: 83.3

NON-FEDERAL:

MINE DESIGN CAPACITY 4.8

RECOVERY RATE:

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	0.4		
1981	1.0		
1982	1.75		
1983	2.75		
1984	3.41		
1985	3.8		
1986	3.8		
1987	3.8		
1988	4.0		
1989	4.3		
1990	4.5		
Post 1990			

NOTES: ①

Mine	Seam	Life	Closing Date	Opening Date
Northern No.1	FF	17yrs	1997	1980
Northern No.2	P	20	2001	1981
Northern No.3	J	26	2006	1981
Rienau No.2	G	29		

All Figures Shown in Million Tons

PRODUCTION SUMMARY

STATE: COLORADO **REGION:** GREEN RIVER **COUNTY:** RIO BLANCO

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
(MEEKER AREA) RIENAU	NORTHERN COAL COMPANY	C076713		320		① U/G	Approved 8-23-79	1.4 TPY
		D044240		160				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 11.714②

SOURCE: USGS MINE PLAN

ASSOCIATED LEASES WITH REASONS WHY:

All Figures Shown in Million Tons

COMMENTS: ① ROOM AND PILLAR FOR THE "G" SEAM.

② REFLECTS COAL TO BE MINED FROM THE "G", "P" AND "J" SEAMS OTHERWISE TOTAL FOR ALL TEN SEAMS IS 45.691 TONS.

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: GREEN RIVER COUNTY: RIO BLANCO

MINE NAME (OR LEASE BLOCK): RIENAU

LESSEE(S) (OR OPERATOR): NORTHERN COAL COMPANY

NUMBER OF LEASES IN BLOCK OR PLAN: 2

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	P	J	G					
FORMATION	WILLIAMS FORK	WILLIAMS FORK	WILLIAMS FORK					
RANK	bit	bit	bit.					
THICKNESS	7.2'	16.4'	15.4' ①					
Btu/LB			10,967 ②					
SULFUR (%)			0.4					
ASH (%)			7.57					
MOISTURE (%)			12.21					
FIXED CARBON (%)								
VOLATILE (%)			34.88					
SEAM DEPTH								
IN-PLACE RESERVES	6.839	14.134						
RECOVERABLE RESERVES	4.044	6.786	0.884					
RECOVERY RATE	59	48	20					

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			45.691 ③	USGS

NOTES: ① RANGES FROM 6.2' TO 19 FEET, 15.4' IS AN AVERAGE.

SEAMS DIP 19° – 20°

② AS RECEIVED BASIS

③ REFLECTS "P" "J" AND "G" SEAMS PLUS SEVEN SEAMS MORE CONSIDERED TO BE RECOVERABLE
THE 7 SEAMS TOTAL 34.542 TONS

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** GREEN RIVER **COUNTY:** RIO BLANCO

MINE NAME OR LEASE BLOCK: RIENAU

LESSEE(S): NORTHERN COAL CO

NUMBER OF LEASES: 2

DATE MINE OPENED: 1965

PROJECTED CLOSING DATE: 1994

REMAINING MINE LIFE: 14

REMAINING RECOVERABLE RESERVES:

FEDERAL: 34.54

NON-FEDERAL:

MINE DESIGN CAPACITY 1.4

RECOVERY RATE: 50 AVERAGE

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION ①	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	.494		
1981	.657		
1982	.623		
1983	.588		
1984	.726		
1985	.726		
1986	1.173		
1987	.901		
1988	.826		
1989	.757		
1990	.688		
Post 1990	2.393		

NOTES: ① REFLECTS EARLIER ESTIMATE SINCE APPROVAL HAS NOT BEEN RECEIVED FROM OSM. ON MINE PLAN PRODUCTION INCREASE.

LONG WALL MINING BEING UTILIZED ALONG WITH CONVENTIONAL MINING.

All Figures Shown In Million Tons

PRODUCTION SUMMARY

APEX NO. 2 COAL MINE
Sunland Mining Corporation
Map Location C - 7
Federal Leases: C0127592 (80 acres)
D046544 (160 acres)
Routt County, Colorado

The Apex No. 2 Coal Mine is approximately 16 miles southwest of Steamboat Springs, Colorado. Access to the mine is from Highway 131 just north of the town of Oak Creek.

The tracts comprising the Apex No. 2 Coal Mine properties are described below:

Property Description	Acres
Federal Coal Lease C0127592 comprised of tracts in sec. 22, T. 4 N., R. 86 W., Sixth Principal Meridian	80.0
Federal Coal Lease D046544 comprised of tracts in secs. 21 and 22, T. 4 N., R. 86 W., Sixth Principal Meridian	160.00

A 40-acre lease modification to Federal Coal Lease D046544 was applied for in March 1975.

The Apex No. 2 Mine is located on one of a group of coal beds known as the Pinnacle seam. The Pinnacle coal bed is stratigraphically situated below the Trout Creek Sandstone and above the Tow Creek Sandstone in the Iles Formation. The entire area is highly faulted. At least four faults are apparent on the Sunland Mining Corporation lease, ranging from 25 to 125 feet in vertical displacement.

The strata within the lease area generally dip to the northwest. The exact strike and dip of the beds vary somewhat from fault block to fault block. The average dip encountered in the Apex No. 2 mine in fault block No. 1 is 7° at N. 50°W. The average dip in the old Apex No. 1 mine in fault block No. 2 is 13° at N. 69°W.

All of the exposed rock formations in the vicinity of the Apex mine are sedimentary and were laid down in upper Cretaceous times. The Apex mine coal deposits lie in the lower part of the Mesa Verde Group.

The lease area is located in the southeast corner of the Sand Wash structural basin. The basin is bounded on the east by the north-trending Park Range Anticline and on the southwest by a northwest-trending synclinal basin extending from Yampa on the southeast to a point several miles northwest of Craig. This basin is bisected by a cross-field known as the Tow Creek Anticline. As a result, a small basin is formed to the southeast of the Tow Creek Anticline which is drained by the Fish, Middle, Trout, and Oak Creeks.

Three mineable seams occur on the property. The Upper seam (zone No. 3) is unmineable due to rock band splits. Approximately 200 feet below the Upper seam, the upper Pinnacle seam is present. This 4-foot seam appears to be fairly consistent. The lower Pinnacle 4-foot coal seam is approximately 50 feet below the upper Pinnacle. Only the higher areas of this seam are mineable. About 160 feet below the lower Pinnacle is another mineable coal seam, the Blacksmith. Present plans do not call for mining the Blacksmith due to access problems.

A coal analysis from the Apex No. 2 Mine is as follows: BTU/lb - 12,200, Ash - 4.37%, Sulfur - 0.59%, Carbon - 51.93%, Volatile matter - 37.14%, and Moisture - 6.66%. The analysis of associated beds is unavailable at this time.

The reserves are distributed in several seams in the Iles Formation. By most recent estimates, Sunland Mining Corporation presently holds in-place recoverable reserves of 1,220,000 tons.

Coal is mined underground by room and pillar methods utilizing continuous miners. Primary haulage is accomplished with electric powered shuttle cars. Belt conveyors transport coal from the mining section(s) to the surface. All men and material transport is accomplished by rubber-tired battery-powered tractors.

Mining was last conducted, prior to shutdown, in the third left section. Secondary mining (pillaring) was being conducted at the time of shutdown. The remaining six or seven standing pillars will be extracted first upon start-up.

The bulk of the remaining mineable coal lies in two 4-foot seams in the SE1/4 NW1/4 of sec. 22. Access to these reserves will be accomplished by driving rock slopes and raises through a 30-foot fault zone into fault block No. 2. Entries will then be driven in the reverse block located to the northwest of the old Apex No. 1 mine. The exact layout of these entries will depend on the configuration of the old No. 1 mine whose present extent is known only by the old mine maps which are of questionable accuracy.

The expected annual production rate is 100,000 tons per year. By most recent estimates, Sunland Mining Corporation presently holds in-place recoverable reserves of 1,222,000 tons. Thus, expected life of the mine is 12 or more years.

CO-37

Production Capability Analysis

Mining conditions for the Apex No. 2 Mine are complicated by the presence of a number of faults on the property. These faults have resulted in vertical displacements of as much as 150 feet. The company's planned solution to this problem is to construct underground slopes and raises from fault block to fault block. Since the coal seams are generally 5 to 7 feet in thickness and the fault blocks have a relatively large areal extent, the principal effect of the faulting is to increase mine development and haulage costs.

Sunland Mining is planning on an overall recovery rate of 80 percent. Achievement of this rate will require nearly total recovery of pillars on retreat from the mined out areas. The well above average competency of the overlying rock formations will allow for this operation to be safely carried out if the experience of the adjacent mined-out Apex No. 1 Mine can be used as a guide. However, a yet to be resolved question is what degree of surface subsidence will result. This is of particular concern where a ranch house, its out buildings and a stock pond are located on the overlying surface. The company's solution to this problem is to leave additional barrier pillars and to reduce the overall recovery rate to 50 percent for the mine workings immediately below the ranch buildings. There remains a questions as to whether these measures will be effective in preventing damage to the buildings.

The planned production rate of 100,000 tons per year is based on a daily production rate of 400 tons. There is no indication in the mining plan as to whether this daily rate is based on one or two continuous miner shifts and if it is based on two miner shifts whether there be one miner working two shifts or two miners working one shift. One miner shift of 400 tons is a readily obtainable under most conditions, so that assumption of a 200-ton miner shift would be quite conservative.

The planned underground transportation system and mine support facilities seem quite adequate for a mine of this size. The use of conveyor haulage in the mains with shuttle cars moving the mined coal from the continuous miner to the conveyor is a standard approach.

There is a screening plant located adjacent to the portal. In that this is a dry plant and that, from the information available, there appears to be adequate provision for the supression of dust, there should be unacceptable environmental problems. All other effects of mining activity will be confined underground.

Coal is marketed on the basis of delivery to the customer at the tipple. It is doubtful that this policy can be maintained once the mine reaches its expanded production rate of 100,000 tons per year. At that time it is quite possible that the company will have to arrange for the trucking of the coal to its more distant customers or to its more distant customers or to the nearest rail loadout facility.

Diligent Development Analysis

The company filed its mining plan in 1975. Approval to mine was granted in 1978. The company has indicated that its ability to conduct economical mining operations is dependent on the federal government approving a 40-acre modification to lease number D-046544 which was also applied for in 1975. It is not known to what degree Sunland will curtail its operations if that modification is not granted. Otherwise, the company should have no difficulty in meeting diligence and continuous operations requirements since the estimated remaining mine life is approximately 12 years at the 100,000-ton-per-year production rate.

STATE: Colorado **REGION:** Green River **COUNTY:** Routt

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Apex No.2 Coal Mine	Sunland Mining Corporation	C-0127592 D-046544 ①	240	80 160		U/G ②	Approved 2-3-78 6-80	0.1

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 1,222

SOURCE: Mine Plan modification 6/80

ASSOCIATED LEASES WITH REASONS WHY:

All Figures Shown in Million Tons

COMMENTS:
① Forty (40) acre lease modification applied for in March 1975, The modification has not been approved as of June 1980.
② Room and pillar retreat
Majority of coal on leases mined out by older Apex No.1 Mine, Remaining coal can be efficiently mined by a small operation.

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Colorado REGION: Green River COUNTY: Routt

MINE NAME (OR LEASE BLOCK): Apex No. 2

LESSEE(S) (OR OPERATOR): Sunland Mining Corp.

NUMBER OF LEASES IN BLOCK OR PLAN: 2

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	#3	Pinnacle 2-U	Pinnacle 2-L					
FORMATION		Iles	Iles					
RANK		Bit	Bit					
THICKNESS		4'	4'					
Btu/LB		12,200	12,200					
SULFUR (%)		0.59	0.59					
ASH (%)		4.37	4.37					
MOISTURE (%)		6.6	6.6					
FIXED CARBON (%)		51.93	51.93					
VOLATILE (%)		37.14	37.14					
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES		0.200	0.100					
RECOVERY RATE		70	70					

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			1.222	M.P.

NOTES:

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Colorado **REGION:** Green River **COUNTY:** Routt

MINE NAME OR LEASE BLOCK: Apex No. 2 Coal Mine

LESSEE(S): Sunland Mining Co.

NUMBER OF LEASES: 2

DATE MINE OPENED: 1978

PROJECTED CLOSING DATE: 1992

REMAINING MINE LIFE: 12

REMAINING RECOVERABLE RESERVES:

FEDERAL: 1.222

NON-FEDERAL:

MINE DESIGN CAPACITY

RECOVERY RATE: 70 M.P.

CUMULATIVE PRODUCTION TO 1979: 0.35 (ACLDS)

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	0.100		Domestic heating 25%
1981			
1982			Spot contracts to
1983			power plants 75%
1984			
1985			
1986			
1987			
1988			
1989			
1990			
Post 1990	0.100		

NOTES: Mine plan indicates the mine will close during 1983 without additional leasing. The above production estimates are from an independent contractor (IC)

All Figures Shown In Million Tons

PRODUCTION SUMMARY

16A, #2

EDNA STRIP MINE
PITTSBURG AND MIDWAY COAL MINING COMPANY
MAP LOCATION C - 3
FEDERAL COAL LEASE: C021601
D033327
D041478
D053710
ROUTT COUNTY, COLORADO

The Edna Strip Mine site is four miles north of the town of Oak Creek and is located within the regional box canyon of the Yampa River Valley. The mine itself is on a west to north facing ridge that slopes toward Trout Creek, located at the base of the ridge.

The Edna mine, operated by Pittsburg and Midway, is a subsidiary of Gulf Oil Corporation. Tracts comprising the Edna Mine are described below:

Property Description	Acres
Federal Coal Lease C021601 in secs. 19, 20, and 30, T.5 N., R.85 W; in secs. 25, T.5 N., R.86 W., Sixth Principal Meridian	826.94
Federal Coal Lease D033327 in secs. 23, 24 and 25, T.4 N., R.86 W., Sixth Principal Meridian	280.0
Federal Coal Lease D041478 in sec. 18, T.4 N., R.85 W.; sec. 13, T.4 N., R.86 W., Sixth Principal Meridian	80.06
Federal Coal Lease D053710 in sec. 14, T.4 N., R.86 W., Sixth Principal Meridian	89.04
Fee land approximation	3,200.00
Total Acreage	4,475.14

17A, #2

The lease area is located in the southeast corner of the Sand Wash structural basin. The coal in the lease area is in the Yampa Coal field and occupies a northwest - southeast trending synclinal basin extending from Yampa on the southeast to a point several miles northwest of Craig. The surface mineable coal seam that is found on the four Federal coal leases is the Wadge seam. It is the "middle coal" group in the Williams Fork Formation of the Mesaverde Group.

Coal mined from the Edna mine is classed as bituminous, suitable as steam coal. A recent modification to the mine plan was approved and allows Pittsburgh and Midway to recover a split that occurs below the Wadge seam. This lower Wadge split ranges in thickness from 1.5 feet to 2.5 feet and can be economically mined by removing a 10- to 12-foot section of interburden. A typical (as received) analysis of the coal is as follows:

Moisutre	12.5%
Volatile matter	34.7%
Fixed carbon	43.3%
Ash	9.5%
Sulfur	0.6%
Btu/lb	10,500.

Estimated recoverable reserves on Federal lease land are as follows:

C021601	510,000 tons[2]
D033327	350,000 tons[1, 2]
D041478	10,000 tons[1, 3]
D053710	510,000 tons[1, 2]
Total Recoverable	1,380,000 tons

1. Reflects tonnage as of April 11, 1980
2. Reflects estimation of reserves for General Mining Order No. 1
3. Reserve based on estimate of lower Wadge split based on surface area and typical thickness.

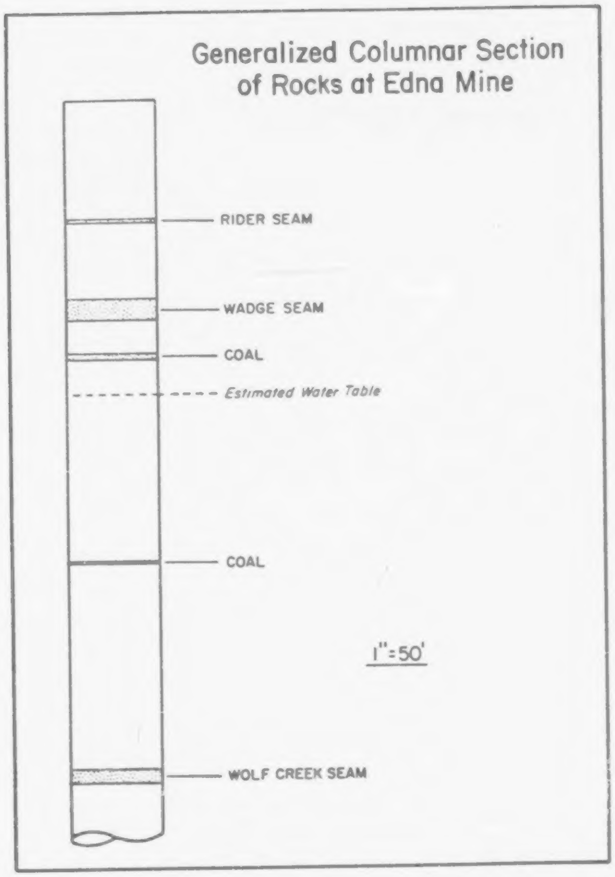
Generalized Columnar Section
of Rocks at Edna Mine
RIDER SEAM
WADGE SEAM
COAL
Estimated Water Table
COAL
1"=50'
WOLF CREEK SEAM

Figure C-8-1. Generalized Columnar Section of Rocks at Edna Mine (after Pittsburg and Midway).

Throughout the remaining life of the mine, including those periods when Federal coal is mined, the production rate is estimated at 1,100,000 tons per year.

Surface clearing will be held to a minimum to preserve the maximum amount of topsoil consistent with efficient operation. Scrapers, or other suitable equipment will remove available topsoil and will either immediately redistribute the topsoil evenly to plow depth on rough graded areas, or, when no such areas are available, will stockpile the topsoil, in accordance with the appropriate Federal regulation.

After the topsoil has been removed, the remaining overburden above the Wadge seam will be drilled and shot to permit removal by the dragline.

The overburden will then be removed using a 40-cubic-yard walking dragline. The dragline will operate on the overburden above the pit. The excavated material will be sidecast and deposited in the adjacent, previously mined pit. After the overburden is removed and the coal seam exposed, any remaining rock and dirt will be cleaned away by the dozer and the coal seam will then be broken by explosives or by ripping. The coal will be loaded into trucks by a power shovel or end-loaders for haulage to the hilltop hopper. The coal will be conveyed by beltline from the hopper to the tipple where it will be crushed, sized, and loaded into railroad cars for shipment to the customer.

Production Capability Analysis

Historically, the Edna Strip Mine has operated primarily on fee and state lands and has relied only minimally on production from Federal leases. This pattern is projected to continue until the planned closure of the mine in 1990. During the remaining ten plus years of mine life there will be a total of approximately 11 million tons of coal produced. Less than 1 million tons of that total production will be produced from Federal leases.

The mining system currently in use is a standard area strip mining technique. Overburden ranging in thickness from 10 to 40 feet is first drilled and blasted. Overburden removal is done with a 40 cubic-yard dragline. Considering the minimal amount of overburden material and a seam thickness that is estimated to be 10 to 12 feet, a dragline of this large a capacity is more than adequate to maintain stripping ahead of coal mining.

The Edna Strip Mine is located on top of a high ridge that is approximately 750 feet above the adjacent river valley. Coal is stripped along the top of this ridge on relatively flat lying terrain, and then the coal is hauled by 50-ton trucks from the pit to a truck-dumping station located at the crest of the ridge. The coal is transported down the fact of the ridge by conveyor to a coal crushing and sizing plant located at the base of the ridge. The coal is then loaded onto unit trains running on a track located next to the coal preparation plant.

There are no apparent mining problems at the mine. The relatively shallow overburden and thick seam make for ideal surface mining, conditions. The operation is located adjacent to rail haulage facilities, so coal transportation is no problem.

Potential environmental problems consist entirely of those related to reclamation. Planned stripping areas do not include any streams or other natural drainage features. Stripping and truck haulage operations are all located on the property and well away from areas that might impact on the public.

Diligent Development Analysis

The current production rate of 1.1 million tons of coal per year and a projected mining closing date in 1990 when all of the recoverable reserves are mined out, the Federal coal having been mined out in 1988, result in the operation being well within compliance with the requirements for diligent development and continuous operation. There is no indication at this time that Pittsburg and Midway is seeking additional reserves to prolong the life of the operation.

STATE: Colorado **REGION:** Green River **COUNTY:** Routt

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Edna Mine	Pittsburg & Midway Coal Mining Co. (Gulf Oil Corp.)	C-021601	4476	826.94	3200	S	Approved 1-31-78	1.1
		D-033327		280.0				
		D-041478		80.06				
		D-053710		89.04				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 1.38
Federal only

SOURCE:
P&M

All Figures Shown In Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:
Reclamation is considered important by P&M Mining Co.

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Colorado REGION: Green River COUNTY: Routt

MINE NAME (OR LEASE BLOCK): Edna Mine

LESSEE(S) (OR OPERATOR): Pittsburg & Midway Coal Mining Co. (Gulf Oil Corp.)

NUMBER OF LEASES IN BLOCK OR PLAN: 4

MINING METHOD: S

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Wadge	Lower Wadge						
FORMATION	Williams Fork							
RANK	Bit							
THICKNESS		1.5 - 2.5						
Btu/LB	10,500							
SULFUR (%)	0.6							
ASH (%)	9.5							
MOISTURE (%)	12.5							
FIXED CARBON (%)	43.3							
VOLATILE (%)	34.7							
SEAM DEPTH	10'-40'							
IN-PLACE RESERVES								
RECOVERABLE RESERVES	1.61							
RECOVERY RATE	80							

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE	1.38	11.39	12.77	P&M
	UNDERGROUND				

NOTES: Deep seams exist and are deemed mineable, however no plans have been made to mine them.

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Colorado **REGION:** Green River **COUNTY:** Routt

MINE NAME OR LEASE BLOCK: Edna Mine
LESSEE(S): Pittsburg & Midway Coal Mining Co. (Gulf Oil Corp.)
NUMBER OF LEASES: 4
DATE MINE OPENED: 1976
PROJECTED CLOSING DATE: 1990
REMAINING MINE LIFE: 10

REMAINING RECOVERABLE RESERVES:
FEDERAL: 1.38
NON-FEDERAL:
MINE DESIGN CAPACITY 1.1
RECOVERY RATE: 80 (ACLDS)
CUMULATIVE PRODUCTION TO 1979: 2.46 (ACLDS)
1979 ACTUAL PRODUCTION: 0.089 (ACLDS)

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	1.0		Great Western Sugar Co.
1981	1.1	0.217	
1982	↓	0.217	Public Service Company of Co.
1983		0.15	
1984		—	City of Colorado Springs
1985			
1986		↓	Pueblo Army Depot
1987		0.	
1988			Central Illinois Lighting
1989	↓		
1990	1.1		City of Fremont, Nebraska
Post 1990			Spot market

NOTES: Information regarding fee leases not available
Federal leases do not contain enough coal to make mining profitable.
The Federal leases are mined concurrently with the fee coal.
Federal coal is expected to be depleted by 1988, but mining will continue on fee lands until 1990

All Figures Shown In Million Tons

PRODUCTION SUMMARY

TROUT CREEK MINE
(EDNA STRIP MINE)
THE PITTSBURG AND MIDWAY COAL MINING COMPANY
MAP LOCATION C - 8
FEDERAL COAL LEASE: C021601 (826.94 Acres)
ROUTT COUNTY, COLORADO

The site for the Trout Creek underground mine is 5 miles north-northwest of Oak Creek, Colorado.

The Trout Creek lease C021601 is included within the Edna Strip mine mining plan, but is not actually within the area to be stripped mined, this operation is to be an underground mine.

The site area is situated on the eastern limb of the northwesterly plunging Twentymile Park syncline. The flanks of this syncline vary asymetrically and are responsible for both the dip-slope topographic expressions and outcrop occurrences of the coal bearing section.

The Trout Creek underground mine will enter into the Wadge coal seam of the middle coal group of the Williams Fork Formation. The Formation is part of the Mesaverde Group, Cretaceous in age and consists of approximately 1,100 to 2,000 feet of alternating thin sandstones, shales, siltstones and coal beds. The Wadge seam is at present the only workable coal bed of mineable thickness (greater than 4.0 feet) on the property and can be worked only by underground mining methods. Overlying the Wadge are found both the Upper Wadge and Lennox seams ranging from 1.5 to 14.0 feet and are 40.0 to 60.0 feet above the Wadge respectively. The average thickness of these seams is between 1.0 feet and 2.5 feet. Immediately underlying the Wadge at an interval of 12 to 16 feet lies the Lower Wadge split with an average thickness between 0.0 and 1.5 feet.

The area of maximum overburden (approximately 820 feet thick) underlies the SW 1/4 of sec. 25 on the Federal Coal Lease C021601.

The entire overlying rock sequence exposed is contained within the Williams Fork Formation and includes a weathered capping rock, the lower portion of the Twentymile Sandstone.

The coal seam structure under the mine property is uniform in slope and direction as revealed by drill hole data. The dip of the strata is to the northwest 8.5 percent at the proposed mine entry increasing to 9.8 percent on the Federal Lease C021601 in the north. The direction of strata varies from N. 25 E. at the entry to N. 15 E. at the northern most limit. Subsurface faulting, if any, should be very minimal is displacement (15 feet or less) and is difficult to find by drill hole methods and the current site spacing. Some faulting is found to the southeast in the old underground mine workings, but none of the mines were worked under the present property. No geologic hazards, particularly old mining works nor major fault displacements are found underlying the mine property.

Mining will be in the Wadge seam. It is a consistent coal that has been mined extensively, both surface and underground, throughout the Twentymile Park Coal Field. The seam averages 5.7 feet in thickness.

A typical as received analysis is as follows:

Heat Value	11,220 Btu/lb
Ash	9.60%
Moisture	9.39%
Sulfur	0.60%
Volatile Matter	35.42%
Fixed Carbon	45.59%

Estimated recoverable reserves are as follows:

C021601	-2,800,000 tons
Privately held land	-2,100,000 tons

Mine pit excavation will begin when the construction roads are completed. The material will be moved by suitable equipment to a designated overburden stockpile. If drilling and blasting of the overburden are necessary, it will be carried out in accordance with all applicable Federal and State explosive and blasting regulations. If during the excavation process, water is encountered in the overburden material in sufficient quantities, a sump will be dug at each excavation level to contain the water encountered. This water will either be used for dust suppression at the construction site or if larger quantities are encountered, it will be pumped into the sedimentation pond for treatment and discharge. The mine pit will require a disturbance of approximately 10 surface acres, and the removal of approximately 450,000 cubic yards of overburden material. This overburden will consist of approximately 210,000 cubic yards of unconsolidated material and 240,000 cubic yards of rock. By the nature of the overburden stockpiles, the rock will be at the bottom of the pit and the unconsolidated material will be on top when the pit is reclaimed. When excavation is completed, approximately 0.55 acres of coal will be exposed at the bottom of the pit, which must be removed before access to the Wadge coal can be obtained.

The mining method for the Trout Creek Mine is based on room and pillar methods using continuous or conventional equipment and belt haulage. Local geologic conditions will affect mining plans and may require adjustments in the mining approach. Five entries, roughly 18 feet to 20 feet wide by 5 feet to 6 feet high, will be expanded from the 4 entries driven off the pit highwall on a westerly direction approximately 800 feet and then turned in a northerly direction and expanded to a 7-entry system and eventually driven to the northermost property control limit. From the north seven-entry system, five-entry submains will be driven west and mining panels will be developed off the submains.

Entries will be driven on 70-foot centers in the mains and submains, with crosscuts also on 70-foot centers. Entries and crosscuts will be on 50-foot centers in the panels. All entries and rooms will be mined 20 feet wide. Barrier pillars have been designed 25 feet wide between mining panels, 50 feet between submains and panels, and 100 feet between mains and panels.

Two sections will be employed following the initial mining development work. Shuttle cars will be used for haulage to the feeder-breakers. The feeder-breakers will crush the coal to a minus 6-inch size and feed it into the beltline. Coal will continue on the beltline out of the pit and across Trout Creek Valley to an open coal storage pile (5,000 to 10,000 ton capacity). From the coal storage pile, coal will be either transferred through a reclaim tunnel by a conveyor belt from under the storage pile to a truck loadout hopper or loaded by a front end loader into a truck and transported to a dump hopper at the existing Edna Surface mine. The existing Edna processing facilities will be employed for crushing and screening of the coal and loading into rail cars for delivery to market.

Room and pillar mining using continuous miners or conventional equipment was selected as being the most economic and efficient method of mineral extraction. The limited amount of reserves and the irregular nature of the lease block precludes the use of longwall equipment.

Full pillar extraction is justified for some portions of the mine property. Greater extraction of the coal resource is realized by employing pillaring methods. Up to 90 percent recovery can be expected by pillaring; approximately 50 percent recovery would be realized by leaving the pillars in-place.

The anticipated mining rates are as follows:

Year	Tonnage Mined
1979	50,000
1980	300,000
1981	480,000
thru 1990	480,000

The mine production rates are based upon a two section mine, 500 tons per section shift, two working shifts per day, one maintenance shift, on a five day week. Approximately 110 people will be employed at this operation.

Unless nominated adjacent Federal leases can be obtained, 1990 will be the end of the reserve life of the underground mine.

The nature of the measures to be taken for surface reclamation include rough and finished grading, return of topsoil to those areas where it existed prior to mining, soil sampling, addition of soil amendments where required, preparation of the seedbed, seeding and planting of approved species and protection of all seeded areas against uncontrolled grazing. All measures will occur in sequential order and in appropriate season taking into consideration climatic conditions.

STATE: COLORADO **REGION:** GREEN RIVER **COUNTY:** ROUTT

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
TROUT CREEK (EDNA STRIP)	PITTSBURG & MIDWAY COAL MINING CO.	CO21601		826.94		U/G	INCOMPLT M.P.	.48

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 4.9

SOURCE: M.P.

All Figures Shown In Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

SHOULD BE PART OF EDNA STRIP MINE

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: GREEN RIVER COUNTY: ROUTT

MINE NAME (OR LEASE BLOCK): TROUT CREEK

LESSEE(S) (OR OPERATOR): P & M

NUMBER OF LEASES IN BLOCK OR PLAN: 1

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	WADGE							
FORMATION	WILLIAMS FORK							
RANK								
THICKNESS	5.7'							
Btu/LB	11,220							
SULFUR (%)	0.6							
ASH (%)	9.6							
MOISTURE (%)	9.39							
FIXED CARBON (%)	45.59							
VOLATILE (%)	35.42							
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES	4.9							
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND	2.8	2.1	4.9	M.P.

NOTES:

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** GREEN RIVER **COUNTY:** ROUTT

MINE NAME OR LEASE BLOCK: TROUT CREEK

LESSEE(S): P & M

NUMBER OF LEASES: 1

DATE MINE OPENED: 1982

PROJECTED CLOSING DATE: 1992

REMAINING MINE LIFE: 10 yr

REMAINING RECOVERABLE RESERVES:

FEDERAL: 2.8

NON-FEDERAL: 2.1

MINE DESIGN CAPACITY .48

RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979: .05

1979 ACTUAL PRODUCTION: .05 ACLDS

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982	0.05		
1983	0.3		
1984	0.48		
1985			
1986			
1987			
1988			
1989			
1990	0.48		
Post 1990			

NOTES:

PROJECTED PRODUCTION

YEAR 1 : 0.050

2 : 0.300

3 : 0.480

4 - 10 : 0.480

All Figures Shown In Million Tons

PRODUCTION SUMMARY

ENERGY NO. 1 AND NO. 2 MINES AND ECKMAN PARK EXTENSION

ENERGY FUELS CORPORATION

MAP LOCATION C- 9

FEDERAL COAL LEASES: D052547
C081330
C16284
C128433
C20900
C22644

ROUTT COUNTY, COLORADO

Energy Fuels Corporation, beginning in 1972, has operated three coal strip mines located in the Yampa coal field in central Routt County, Colorado. The Energy No. 1 and Energy No. 2 mines, mining both fee and Federal coal, are located approximately 15 miles southwest of Steamboat Springs and 12 miles southeast of Hayden, Colorado. The Energy No. 3 mine, mining only fee coal, is 7 miles to the northeast. A fourth area, the Eckman Park Extension, will mine both fee and Federal coal, and is an extension to the southwest of the Energy No. 1 mine. Most of the reserves of the original Energy No. 1 mine and the Energy No. 2 mine have already been mined.

The following Federal lands are included in the Energy No. 1 and 2 mines, and the Eckman Park Extension to the Energy No. 1 mine:

Federal Coal Lease D052547 comprised of tracts in sec. 9, T.4 N., R. 86 W., Sixth Principal Meridian and in secs. 28, 29, 32, and 33, T. 5 S., R. 86 W., Sixth Principal Meridian containing 1,145.13 acres.

Federal Coal Lease C081330 comprised of tracts in secs. 8, 9, 17, and 18, T. 4 N., R. 86 W., Sixth Principal Meridian and in secs. 20, 21, 28, 29, and 33, T. 5 N., R. 86 W., Sixth Principal Meridian, containing 2,215.28 acres.

Federal Coal Lease C16284 comprised of tracts in sec. 10, T. 4 N., R. 86 W., Sixth Principal Meridian, and in secs. 33 and 34, T. 5 N., R. 86 W., Sixth Principal Meridian, containing 263.11 acres.

Federal Coal Lease C128433 comprised of tracts in secs. 19 and 30, T. 5 N., R. 86 W., Sixth Principal Meridian, containing 474.93 acres.

Federal Coal Lease C20900 comprised of tracts in sec. 19, T. 5 N., R. 86 W., Sixth Principal Meridian, and in sec. 25, T. 5 N., R. 87 W., Sixth Principal Meridian, containing 419.87 acres.

The Energy No. 1 mine includes Federal Coal Leases D052547, C16284 and all of C081330 except sec. 20 and 21, T. 5 N., R. 86 W. Energy No. 2 mine includes C128433, C20900, and sec. 20 and 21, T. 5 N., R. 86 W., of Federal Coal Lease C081330.

Eckman Park Extension to Energy No. 1 Mine

Federal Coal Lease C22644 comprised of tracts in secs. 7, 8, 18, and 19, T. 4 N., R. 86 W., Sixth Principal Meridian and in sec. 13 and 24, T. 4 N., R. 87 W., Sixth Principal Meridian, containing 1,789.70 acres.

The 6 Energy Fuels Corporation Federal coal leases contain a total of 6,308.02 acres. The corporation also owns about 5,300 acres of private fee land.

The area mined by Energy Fuels Corporation is underlain by the Upper Cretaceous-age Williams Fork Formation of the Mesaverde Group and lies on the southeastern flank of the Twentymile Park syncline. Strata dip northwesterly at 6 to 8 degrees. The mine area is broken by a number of northwest-trending faults with vertical displacements ranging from 1 to over 50 feet.

Two coal seams, the Fish Creek and the Wadge, in the Williams Fork Formation have been actively mined by Energy Fuels Corporation. The

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scraper and stockpiled. The overburden is drilled to the top of the coal on approximately an 18-foot-square pattern, depending on the overburden. The holes are loaded with ANFO and blasted and the overburden is removed to an adjacent pit from which coal has been removed. The exposed coal is cleaned off, drilled, loaded with ANFO and blasted. Broken coal is loaded into 50-ton trucks with a front-end loader and hauled to the tipple where it is crushed to minus two inches and conveyed to a 100,000-ton storage pile.

This pile feeds directly to a unit-train loading facility. These facilities are located along a twelve-mile rail spur of the Denver and Rio Grande Western Railroad from the town of Milner.

Rough backfilling and grading of the mined property will begin within 180 days after coal recovery. The surface will be graded to approximately its original contour, the topsoil replaced and the area revegated for use as rangeland, pastureland and cropland.

Coal is being shipped by unit-train to the Public Service Company of Colorado and the Illinois Power Company under existing contracts.

Wadge coal seam, mined at the Energy No. 1 mine and the main seam in the Eckman Park area, is part of the Middle Group coal zone (a zone of interbedded sandstone, shale and coal beds). The Wadge varies from 5.5 to 10 feet in thickness and is overlain by 300 to 400 feet of alternating sandstone and shale and the massive cliff-forming Twentymile Sandstone. The Upper Group coal zone, containing the Fish Creek Coal seam, overlies the Twentymile Sandstone. The Fish Creek coal seam has an average thickness of four feet where mined at the Energy No. 2 mine.

The Lenno coal seam occurs sporadically about 60 feet above the Wadge coal seam. It is highly irregular, generally less than two feet thick and is very high in sulfur. It is of a mineable thickness over part of the Eckman Park Extension area and under 0 to 20 feet of overburden but the high sulfur content makes it unmarketable.

The Wolf Creek coal seam lies 130 to 150 feet below the Wadge where it is up to 20 feet thick. However, it is not economically feasible to strip mine because of overburden thickness.

Coal from the Energy Fuels Corporation mines are classified as high-volatile C bituminous and show the following range in quality:

Moisture	10.00 - 12.18%
Volatile matter	36.00 - 38.15%
Fixed carbon	43.50 - 44.60%
Ash	8.6 - 9.0 %
Sulfur	0.55 - 0.57%
Btu/lb	10,900-11,100

About 224 acres will be mined per year in the Eckman Park area. Annual production is anticipated to be about 3,900,000 tons with about 31,000,000 tons of coal mined over an 8-year mining period.

Energy Fuels Corporation will use a dragline and bulldozer to remove overburden at the Eckman Park property after topsoil is removed with a

Production Capability Analysis

As indicated above, Energy Fuels has been actively involved in the large-scale surface mining of coal in northwestern Colorado since 1972. During this time they have mined all of the recoverable coal from six (6) federal leases and are nearly ready to begin mining on their seventh federal lease.

The company's proposed approach to mining on this most recently acquired lease, now referred to as the Eckman Park Extension of their Energy No. 1 and No. 2 Mines, is a unique combination of dragline stripping and truck and shovel overburden removal. The bulk of the overburden removal requirement is handled by three (3) draglines; 55, 21 and 14 cubic yard. In the approved eight-year mining plan for the mining of the 31 million tons of recoverable coal located on the Eckman Park Extension, the company has indicated overburden removal assignments for each of the draglines over the entire eight-year period. The variation in the bucket sizes on the draglines and the effective depths to which they can strip requires that each machine be assigned on the basis of the amount of the overburden which must be handled in a particular section of the mine over a specified period of time and to a miximum overburden depth. This careful assignment of machines is necessary if the required amounts of coal are going to be uncovered in time for mining and shipment to the customer.

The only shovel on the property is a 28-cubic-yard rock shovel which is used to load into 170-ton trucks. The availability of this single truck and shovel team allows for flexibility in the scheduling of the draglines as well as a capability to more overburden much greater distances without the inefficiency and expense of dragline rehandle. This latter capability will be particularly important in the Eckman Park Extension because the combination of the need to reclaim the spoil to approximately the original contours of the land and the fact that swell resulting from the fragmentation of the overburden materials will create more than 14 million cubic yards of material that are excess to backfilling requirements. This excess material will be formed into two low profile hills. This type of requirement would be almost impossible to fulfill with draglines alone.

The company has already experienced some delays in stripping operations which will affect their ability to adhere to the schedules in the mining plan. It appears that the company has been conscientious in advising OSM of these delays and requesting the appropriate changes in the mining plan. None of the changes to date should significantly impact on the projected eight-year life of the Eckman Park Extension.

Included in the mining plan is a provision for the company to use underground mining methods to recover approximately 200,000 tons of the reserves. By combining recovery of this coal with surface mining operations it will be possible to enter the seam with a drift mine from the bottom of one of the pits rather than constructing a slope or a shaft to gain entry. This approach will definitely improve the economics that coal which otherwise would have to be left unrecovered. The only concession required on the part of OSM is approval for the particular pit involved to be left open longer than 180 days provided for in the regulations. This approval has been granted.

Foidel Creek Valley, which runs through the center of the Eckman Park Extension, has been designated an alluvial valley floor by OSM. Energy Fuels has opposed that designation on the basis that records inicate that the valley has never been used for farming and that it is highly unlikely that it will be because of its narrowness. OSM has persevered in its original ruling, however, and required that the comapny maintain a 200-foot boundary between mining operations and the valley. Because there are indications that the coal seams thin under the valley, there have been no estimates of the quantity of coal that will remain unrecovered by this action.

Transportation of coal to market will be by 100-car unit trains. The trains will be loaded at the loadout facility that has served the Energy No. 1 and No. 2 Mines.

Diligent Development Analysis

Because of the very high annual production rate relatively to the size of the reserves, no problem is foreseen with respect to the company meeting diligent development and continous operation requirements for the Eckman Park Extension. As

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indicated above, the company is well experienced in this area. Because of this, it is felt that all yet unidentified production and environmental problems will be resolved in a timely manner and not significantly affect the production schedule presented in the mining plan.

STATE: COLORADO **REGION:** GREEN RIVER **COUNTY:** ROUTT

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
ENERGY FUELS	ENERGY	D052547		1145.13			Approved 9-28-77	3.9 TPY
No. 1 & No. 2	FUELS	C081330		2215.28		S		
MINES	CORPORATION	C16284	11608	263.11	5300			
AND		C128433		474.93				
ECKMAN PARK		C 20900		419.87				
EXTENSION		C 22644		1789.7				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 62.00

SOURCE:

MINE PLAN

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: GREEN RIVER COUNTY: ROUTT

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
ENERGY FUELS No 1&2	ENERGY FUELS CORP	6	S

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	FISH CREEK	WADGE						
FORMATION	WILLIAMS FORK	WILLIAMS FORK						
RANK	hvCb	hvCb						
THICKNESS	4'	5.5'-10'						
Btu/LB	10980	11160						
SULFUR (%)	.47	.40						
ASH (%)	7.0	6.72						
MOISTURE (%)	14.77	11.40						
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL			62.0	MINE PLAN
	SURFACE				
	UNDERGROUND				

NOTES:

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** GREEN RIVER **COUNTY:** ROUTT

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES
ENERGY FUELS No 1 & No. 2	ENERGY FUELS CORP.	6

DATE MINE OPENED: 1971
PROJECTED CLOSING DATE: 1983
REMAINING MINE LIFE: 8 ECKMAN PARK ONLY

REMAINING RECOVERABLE RESERVES:
FEDERAL: 62.0
NON-FEDERAL:

MINE DESIGN CAPACITY 3.9 TPY
RECOVERY RATE: 98

CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	3.9 est.		P.S. OF COLORADO
1981			
1982			ILLINOIS Power Co.
1983			
1984			
1985			
1986			
1987			
1988	3.9		
1989	3.9		
1990	3.9		
Post 1990			

NOTES:

All Figures Shown In Million Tons

PRODUCTION SUMMARY

JOHNNIES MINE
PROSPER LOMBARDI
MAP LOCATION C - 10
FEDERAL LEASE: C23396 (80.0 Acres)
ROUTT COUNTY, COLORADO

Johnnies mine is located approximately eight miles west of Oak Creek, Colorado. The mine itself is on a hill to the west of Little Trout Creek.

The coal of interest is contained in the Pinnacle No. 2 bed, part of the lower series of the Iles Formation. The Pinnacle No. 2 bed dips 2° to 4° to the northwest and has an overburden of 400 feet. The USGS believes the mine can be profitably mined as a small undergound operation. Analysis of the coal, as indicated in the mine plan and the USGS information notice is as follows:

Moisture	8.4%
Ash	3.8%
Sulfur	0.5%
Volatile Matter	39.0%
Fixed Carbon	48.8%
Heat Value	12,340 Btu/lb
Recoverable Reserves	119,560 tons

The mine plan calls for conventional mining methods, utilizing a coal cutter to under cut the coal and blast the section out, coal will then be battery hauled from the face to the surface. The Pinnacle No. 2 seam contains a thin band of rock and it is to be removed by hand and gobbed inside the mine. For such a small operation, the recovery rate is expected to be at a maximum of 60 - 75 percent. Due to the dip, the mine is designed with the panels on the strike in the northeast or southwest direction.

Coal obtained from this mine is expected to find a viable local market for domestic coal, however, the coal can also be used as steam coal.

Production Capability Analysis

The lessee, Prosper Lombardi is experienced in coal mining. It is however, unlikely that this lease will be developed as planned because the lessee does not have access to the necessary capital to fund mine development. The lessee's original financing arrangements for the mine were withdrawn during the long delay between the initial application for the lease and the actual lease offering.

Diligent Development Analysis

This lease was issued after passage of the 1976 coal leasing amendments and therefore is subject to a 10 year diligence period. Even though the amount required to be produced is small, it now looks unlikely that the lessee will be able to bring the mine into operation because of financing difficulties. This lease could become the first federal coal lease terminated for non-production.

STATE: COLORADO **REGION:** GREEN RIVER **COUNTY:** ROUTT

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
JOHNNIES MINE	PROSPER LOMBARDI	C23396		80.0		U/G	SUBMITTED	0.010

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: .119500

SOURCE: USGS

All Figures Shown In Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: GREEN RIVER COUNTY: ROUTT

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
JOHNNIES MINE	PROSPER LOMBARDI	1	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	PINNACLE 2							
FORMATION	WILLIAMS FORK							
RANK								
THICKNESS	4.5							
Btu/LB	12,340							
SULFUR (%)	0.5							
ASH (%)	3.8							
MOISTURE (%)	8.4							
FIXED CARBON (%)	48.8							
VOLATILE (%)	39.0							
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES	.11956							
RECOVERY RATE	60-75							

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			.11956	USGS

NOTES:

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** GREEN RIVER **COUNTY:** ROUTT

MINE NAME OR LEASE BLOCK: JOHNNIES
LESSEE(S): PROSPER LOMBARDI
NUMBER OF LEASES: 1
DATE MINE OPENED:
PROJECTED CLOSING DATE:
REMAINING MINE LIFE:

REMAINING RECOVERABLE RESERVES:
FEDERAL:
NON-FEDERAL:
MINE DESIGN CAPACITY 0.01
RECOVERY RATE: 60-75
CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			DOMESTIC
1982			& LOCAL STEAM
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990			
Post 1990			

NOTES:

PRODUCTION NOT TO EXCEED 0.01 TPY

CONVENTIONAL ROOM & PILLAR

All Figures Shown in Million Tons

PRODUCTION SUMMARY

117

SENECA 2W MINE
PEABODY COAL COMPANY
MAP LOCATION C -11
FEDERAL LEASES: C081251 (2,519.03 Acres)
C081258 (2,323.44 Acres)
ROUTT COUNTY, COLORADO

The Seneca 2W surface mine is located seven miles southeast of Hayden, Colorado in Routt County on the northeastern slopes of Williams Fork Mountains. Dry, Sage and Grassy Creeks, tributaries of Yampa River, drain this general area. Relief is generally moderate. The mine is located on the upper part of a west-facing slope of a northerly-trending ridge. The slope varies between 15 and 30 percent. Hubberson Gulch and Dry Creek flow at its lower west end. On the east, other smaller ridge lines separate the steep east escarpment of this main ridge from Sage Creek. The total LMU contains approximately 7,120 acres.

The tracts comprising the Seneca 2W properties are described below:

Property Description	Acres
Federal Coal Lease C081251 comprised of tracts in secs. 3, 9, 10, 14, 15, and 20-22, T.5 N., R.88 W., Sixth Principal Meridian	2,519.03
Federal Coal Lease C081258 comprised of tracts in secs. 23, 26, 27, and 33-35, T. 5 N., R. 88 W., Sixth Principal Meridian	2,323.44

The principal coal bed of interest at the mine site is the Wadge; others are the Wolf and Sage Creek coal beds. These coal beds are described as follows: the Wadge coal bed averages 12 feet in thickness, and is about 400 feet above the base of the Williams Fork Formation. The Wolf Creek coal bed is a 17- to 18-foot bed in some places, but in others it splits into 2 or more beds, and is about 150 feet below the Wadge. The Sage Creek seam averages 4.2 feet in thickness.

An evaluation of the coal reserves in the Seneca 2W area was accomplished by a planned drilling program and by calculations based on the results of this program. The drilling was located on 330-foot centers from the crop line to a 100-foot overburden range, and the crop line was defined by drilling one hole on the coal and one hole off the coal on 150-foot centers. Reserves were then calculated by determining acreage from the maps and seam thicknesses from the drill logs.

Following are results of these reserve calculations:

	COAL SEAMS		
	Wadge	Wolf Creek	Sage Creek
Cubic yards of overburden	41,841,000	3,574,000	4,071,000
Average thickness of overburden, feet	52.6	70.5	40.9
Tons of Coal	9,551.300	1,008,300	479,700
Average thickness of coal, feet	12.0	17.5	4.2

The quality of the coal reserves in the Seneca 2W area as determined by analyses of a series of core coal samples at Peabody Coal Company's central laboratory at Freeburg, Illinois, have been reported to be:

	COAL SEAMS		
	Wadge	Wolf Creek	Sage Creek
Ash content, percent as received	6.84	9.45	6.60
Sulfur content, percent as received	0.44	0.58	0.61
Moisture, percent as received	12.01	13.09	11.96
Btu as received	10,918	10,285	10,971

The planned mining sequence is to remove and stockpile the topsoil to be used later on the graded spoil piles. Upon removal of the topsoil, the overburden will be mined by bench blasting agents. The blasted overburden is to be removed by a dragline. The exposed coal surface will be cleaned using a bulldozer, and the coal itself blasted lightly to facilitate ease in digging. The coal will be loaded using a backhoe-type loader, assisted when necessary by a front-end loader, and transported by 50 ton truck combination. Mining on Federal lease C081251 is scheduled to begin in 1980.

The table below outlines Seneca Coal's limited coal supply commitment for the operations at Seneca 2W mine site.

Year	Production (tons)
1980	900,000
1981 thru 1984	810,000
1985	760,000
1986 thru 1995	685,000.

Pursuant to a coal supply contract executed in 1965 and updated in 1971, Peabody Coal is committed to supply fuel requirements of the Hayden power plant. The first unit of the plant, which has a revised capacity of 181 MW, has been supplied by the Seneca mine since 1965. The second unit, a 250 MW facility, has been supplied by the Seneca 2 mine since September, 1976.

Production must increase from 1975 rate of 600,000 tons per year to 1,500,000 tons per year to meet the increased fuel requirements. In 1980, mining will begin on Federal leases in the Seneca 2W mine. At the rate of 900,000 tons per year, Seneca 2W operations will be exhausted by 1995. At this point, mining is projected to proceed in the Yoast area.

The coal from the Seneca 2W mine is hauled by truck from a loading point adjacent to the pit to the Hayden Station. At peak production, the coal will be transported in 25-ton trucks at the rate of 144 truckloads per day for 250 days/year. Haulage proceeds during daylight hours only over company constructed roads to County Road 53 and on to the Colorado-Ute generating station.

CO-67

Production Capability Analysis

The mining technique planned for use in Peabody's Seneca 2W mine is a duplicate of that developed during 16 years of strip mining in the Seneca and Seneca 2 mines. It is basically a traditional area strip mining technique somewhat modified to allow for the 12 to 15 degree dip that prevails over much of the LMU's. The box cut is located at the bottom of the slope at the limit of mining defined by increasing overburden which makes mining non-economical. Parallel cuts to expose subsequent strips of coal are made across the slope at an angle to the slope. In this way the dragline is always located on the high wall and casts spoil down slope into the mined-out pit.

The principal seam recovered no the property is the Wadge. Alternatively, lesser amounts of coal are recovered from the underlying Wolf Creek and Sage Creek seams. However, Wolf Creek coal is mined only where the overlying Wadge seam has been eroded away and Sage Creek coal is mined only where both the Wadge and the Wolf Creek seams have been eroded away. In effect, even though coal is being extracted from three different seams, the mine is a single-seam operation.

Life-of-the-mine stripping ratios are projected at a very favorable 4 or 5 to 1. The favorable effect on mine economics is better appreciated when it is realized that over 80 percent of the reserves are scheduled for recovery from the 12-foot thick Wadge seam and that the average overburden thickness for this coal is a very nominal 52.6 feet.

There are no unusual mining problems anticipated for the Seneca ZW operation. The location of the high wall on the up-slope side of the pit requires extra care to ensure that all loose material is removed from the high wall before men and equipment are allowed into the pit bottom for coal recovery. This is one by dragging bucket and chains after a cut is completed and before the dragline moves to its next digging position.

Weather in this region with its high elevations, 7,000 to 8,000 feet, and rugged terrain has an impact on both mining and reclamation operations. The winters are long, with many days of sub-zero temperatures and total snow fall in the range of 150 to 160 inches, and the summers are short. With growing seasons that average 60 to 70 days in length, it is especially important that reclamation activities be properly designed and executed. To date, the company has been successful in its reclamation operations.

There are no unusual environmental problems associated with the operation. All of the stripping operations are being conducted up-slope from existing streams in the area. Provison has been made for siltation ponds to recover suspended sediment from run-off before it can get into the natural drainage system. The primary source of dust, the coal haulage roads, is partially controlled by proper maintenance of the surface of the roads.

Transportation of the mined coal consists of haulage in 25-ton trucks directly from the pit to the Hayden power plant. It is estimated that the total haulage distance, over a combination of company-owned and county roads, is about eight miles. This system should be adequate over the life of the mine, although consideration should be given to using larger haulage trucks so as to decrease truck traffic and thereby minimize potential traffic hazards and impact on the environment.

Diligent Development Analysis

It is anticipated that they Peobody will have no difficulty meeting planned production rates over the remaining life of the mine. They are well experienced in the type of mining system being used and familiar with operating in this climate. Current mining rates place the company well within the requirements for diligent development and continuous operation.

STATE: Colorado **REGION:** Green River **COUNTY:** Routt

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Seneca 2W	Seneca Corp (Peabody) (Material Service Corp.)	C-081251	7,120 ①	2519.03		S	Approved 9-14-77	0.9 tpy
		C-081258		2323.44				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 14.464

RECOVERABLE: 11.571 ②

SOURCE: USGS

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

① Fee land not described

② Based on an 80% recovery rate

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Colorado REGION: Green River COUNTY: Routt

MINE NAME (OR LEASE BLOCK): Seneca 2W

LESSEE(S) (OR OPERATOR): Seneca Corp. (Peabody Coal)

NUMBER OF LEASES IN BLOCK OR PLAN: 2

MINING METHOD: S

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Wadge	Wolf Creek	Sage Creek					
FORMATION	Williams Fork	→	→					
RANK	Bit	→	→					
THICKNESS	12'	17.5'	4.2'					
Btu/LB	10918	10285	10971					
SULFUR (%)	0.44	0.58	0.61					
ASH (%)	6.84	9.45	6.6					
MOISTURE (%)	12.01	13.09	11.96					
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES	9.551	1.008	0.480					
RECOVERABLE RESERVES								
RECOVERY RATE	80	80	80					

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			14.464	USGS
RECOVERABLE:	TOTAL			11.571	
	SURFACE				
	UNDERGROUND				

NOTES: Coal seam dips at 19° or 24°

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Colorado **REGION:** Green River **COUNTY:** Routt

MINE NAME OR LEASE BLOCK Seneca 2W	LESSEE(S) Seneca Corp.	NUMBER OF LEASES 2	DATE MINE OPENED: PROJECTED CLOSING DATE: 1995 REMAINING MINE LIFE: 15
REMAINING RECOVERABLE RESERVES: FEDERAL: 11.571① NON-FEDERAL:		MINE DESIGN CAPACITY 0.9 RECOVERY RATE: 80	CUMULATIVE PRODUCTION TO 1979: 1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	0.90(3)		
1981	0.81		② Hayden Power Plant,
1982	↓		Estimated to be 1.5 tpy
1983	↓		
1984	0.81		
1985	0.76		
1986	0.685		
1987	↓		
1988	↓		
1989	↓		
1990	0.685		
Post 1990	3.425		

NOTES: ① Based on 80% recovery and USGS reserve estimate

② Based on this requirement, Seneca must open new land and obtain new leases.

(3) PRODUCTION from FEDERAL LEASES ONLY, MINE LIFE IS 15 yrs for FEDERAL ONLY

All Figures Shown in Million Tons

PRODUCTION SUMMARY

11A, #2

KING COAL MINE (NATIONAL KING COAL MINE)
NATIONAL KING COAL, INC.
MAP LOCATION C - 12
FEDERAL COAL LEASE P058300
LA PLATA COUNTY, COLORADO

The King Coal mine, owned and operated by National King Coal, Inc., is located in the central part of the Durango coal field (Hesperus or Red Mesa district) in La Plata County, Colorado. The mine lies on the southern edge of Hay Gulch, a southwesterly flowing tributary of the La Plata River, approximately 4.4 miles southwest of Hesperus and 12 miles west of Durango, Colorado.

Federal Coal Lease P058300 is comprised of tracts in secs. 31 and 32, T.35 N., R.11 W., New Mexico, Sixth Principal Meridian and contains 160 acres. An application for additional contiguous Federal lands lying to the south and west of the current lease has been submitted to the BLM.

Entries of the King Coal mine are driven into the coal bearing Menefee Formation, the middle member of the upper Cretaceous age Mesaverde Group. Two coal seams within the Menefee crop out or are exposed in the lease area, however, only the upper seam has been developed in the King Coal mine.

The upper seam, which is stratigraphically near the top of the Menfee Formation, is known as the Pueblo or "F" seam or the No. 1 bed. It varies in thickness from 66 to 74 inches and averages 72 inches where mined in the King Coal mine. This coal seam is overlain by a few inches of interbedded sandstone and coal which are, in turn, overlain by a massive sandstone forming a competent roof. Overburden depths range from approximately 130 to 280 feet.

The lower seam, near the middle of the Menefee Formation, is known as the Hesperus bed or the No. 2 bed. It averages about 6 feet in thickness and lies approximately 80 to 90 feet below the upper seam with interbedded sandstone and shale between the two.

A third coal seam about 240 to 290 feet below the No. 1 bed (near the base of the Menefee Formation) ranges in thickness from 3 to 7 feet and may also underlie the King Coal property.

The King Coal mine is located on the northern flank of the San Juan Basin. Strata dip gently about 3°S. 35°W. in the mine area. There is no evidence of significant faulting in the area.

Coal produced from the King Coal mine is classified as high-volatile B bituminous and may be of coking quality. Average as-received proximate analysis are as follows:

Moisture	2.4%
Volatile matter	36.2%
Fixed carbon	57.3%
Ash	4.2%
Sulfur	0.28%
Btu/lb	13,560

Present production, according to a March, 1979 mine plan, runs from 65,000 to 70,000 tons per year with production expected to continue for at least 7 years (until June 1987) under the current lease. Reserves are estimated to be 1,000,000 tons in-place in the Pueblo with about 700,000 tons recoverable. The recovery rate of approximately 70 percent depends on roof and floor conditions. The underlying coal seams are not presently being mined.

Underground mining is being conducted using a room and pillar mining method. Entries have been driven in a southerly direction across the leased area and panels developed. Coal is extracted at the mine face with a continuous mining machine, and moved by belt conveyor to the surface where it is crushed, screened and stockpiles.

Some coal is sold locally. The majority is trucked to New Mexico or other markets. The nearest Denver and Rio Grande Western Railroad railheads are a South Fork near Del Norte, Colorado (about 140 miles away) or at Ridgeway, Colorado (about 100 miles away).

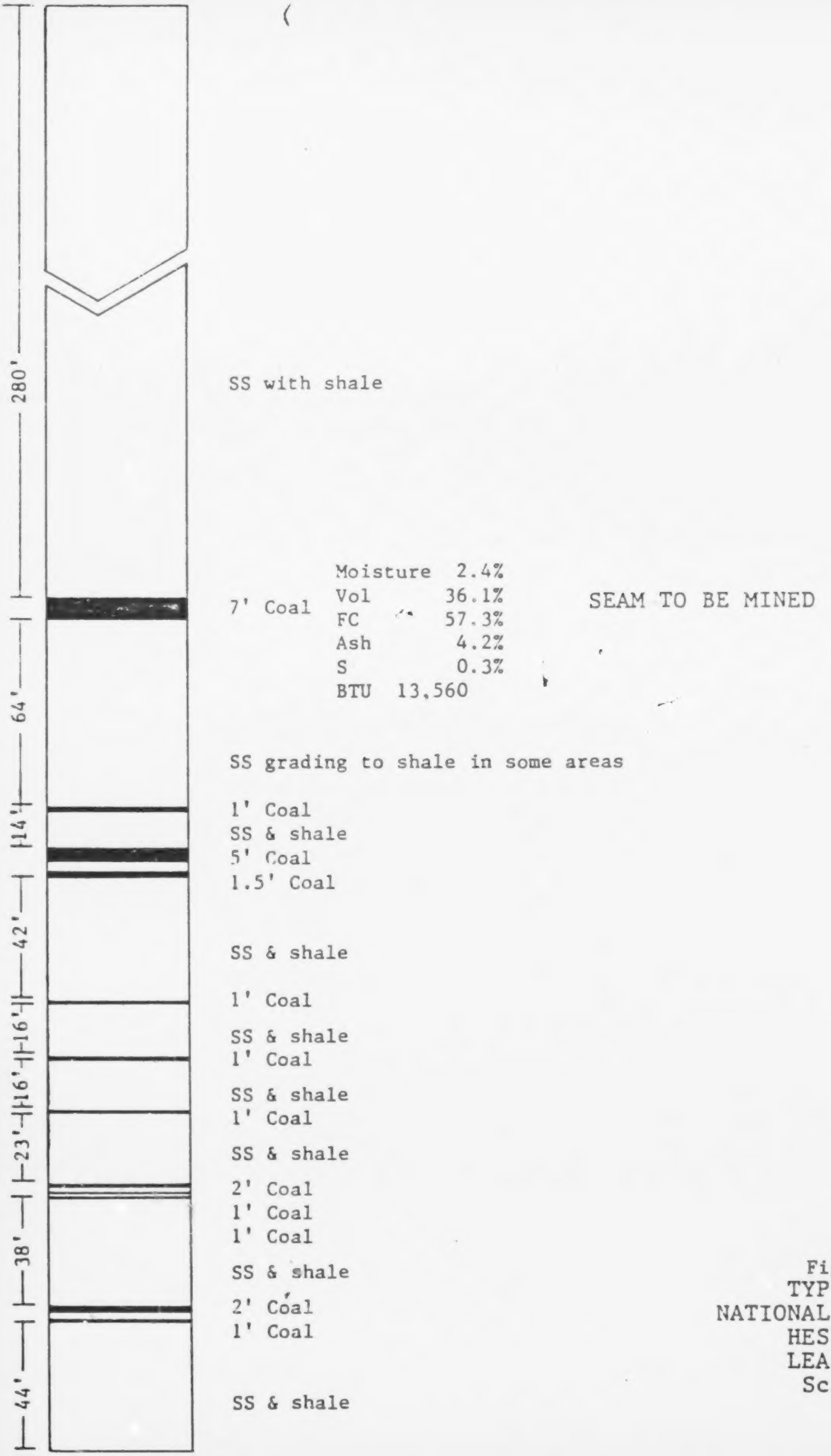

280'
SS with shale
7' Coal
Moisture 2.4%
Vol 36.1%
FC 57.3%
Ash 4.2%
S 0.3%
BTU 13,560
SEAM TO BE MINED
64'
SS grading to shale in some areas
14'
1' Coal
SS & shale
5' Coal
1.5' Coal
42'
SS & shale
1' Coal
16'
SS & shale
1' Coal
16'
SS & shale
1' Coal
23'
SS & shale
2' Coal
1' Coal
1' Coal
38'
SS & shale
2' Coal
1' Coal
44'
SS & shale

Figure C-15-1.
TYPICAL SECTION
NATIONAL KING COAL MINE
HESPERUS, COLO.
LEASE PU 058300
Scale 1"= 50'

Production Capability Analysis

As can be inferred from the above descriptive material, the National King Coal Mine is a relatively small operation. Its nominal annual capacity of 70,000 tons of coal per year is equivalent to a daily production of 280 tons. This magnitude of production rate is readily achievable by operating the existing continuous miner on a single-shift-per-day basis.

Considering the competency of the overlying sandstone formation as a roof rock and the relatively shall overburden depth, the projected recovery rate of 70 percent is quite realistic. Depending upon the spacing of the entries and the thickness of the barrier pillars, it should be possible to obtain nearly 100 percent extraction of the room pillars during secondary mining operations. Even if the final figure for room pillar recovery is significantly less than 100 percent because of yet unknown conditions, the overall recovery rate of 70 percent should be achievable due to the relatively small areal extent of the mine.

The existing conveyor belt system for transporting coal out of the mine and the associated feeder-breakers underground and truck loading facilities on the surface seem quite adequate for a mine of this size. Based on the current use of 30-ton trucks for moving the goal from the mine to its local markets, the average daily loadout rate is less than 10 trucks. The existence of an 8,000-ton stockpile capability at the truck loadout facility provides the operators considerable flexibility in matching the mine production rate to the coal marketing rate.

Environmental conditions in the area adjacent to the portal are presently less than satisfactory because of past operating policies during the approximately 45-year history of the mine. The owners have now segregated the remaining uncontaminated topsoil in the portal area so as to have it available for reclamation when the mine is closed in 1987. There is no indication of other environmental problems such as contamination of surface or sub-surface water.

Diligent Development Analysis

The National King Coal Mine is well within the requirements for diligent development and continuous operation. All the evidence available at this time indicates that the mine will close down in 1987.

STATE: COLORADO **REGION:** SAN JUAN RIVER **COUNTY:** LA PLATA

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY *
NATIONAL KING COAL MINE	NATIONAL KING COAL, INC.	P058300	160	160		U/G	Approved 1-30-78	65,000 to 70,000 TONS PER YEAR

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 1,000,000

RECOVERABLE: 700,000

SOURCE: LESSEE

* SMALL MINE, ACTUAL FIGURES

~~All Figures Shown in Million Tons~~

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: SAN JUAN RIVER COUNTY: LA PLATA

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
NATIONAL KING COAL	NATIONAL KING COAL, INC.	1	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	"F"							
FORMATION								
RANK	hvBb							
THICKNESS	75"							
Btu/LB								
SULFUR (%)								
ASH (%)								
MOISTURE (%)								
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES	1,000,000							
RECOVERABLE RESERVES	700,000							
RECOVERY RATE	70							

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND	1,000,000		1,000,000	
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND	700,000		700 000	MINE PLAN

NOTES:

ACTUAL FIGURES - SMALL MINE

~~All Figures Shown in Million Tons~~

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** SAN JUAN RIVER **COUNTY:** LA PLATA

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES
NATIONAL KING COAL	NATIONAL KING COAL INC	1

DATE MINE OPENED: 1936
PROJECTED CLOSING DATE: 1987
REMAINING MINE LIFE: 7

REMAINING RECOVERABLE RESERVES:
FEDERAL: 700,000
NON-FEDERAL:

MINE DESIGN CAPACITY 70,000
RECOVERY RATE: 70,0

CUMULATIVE PRODUCTION TO 1979: 20,280,000 ACLDS
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	65,000		
1981			COAL SOLD LOCALLY AND IN
1982			NEW MEXICO
1983			
1984			
1985			
1986	65,000		
1987 (JUNE)	32,500		
1988			
1989			
1990			
Post 1990			

NOTES:

ACTUAL FIGURES SMALL MINE
~~All Figures Shown in Million Tons~~

PRODUCTION SUMMARY

ORCHARD VALLEY MINE
COLORADO WESTMORELAND, INC.
MAP LOCATION C - 13
FEDERAL COAL LEASES: C25079
C27432
DELTA COUNTY, COLORADO

The Orchard Valley mine is located on the southern edge of the Grand Mesa coal field (Paonia coal district) in Delta County, Colorado. The mine, operated by Colorado Westmoreland, Inc., lies in Stevens Gulch on the northwestern edge of the North Fork Valley of the Gunnison River, and is approximately 3 miles northwest of the community of Paonia, Colorado.

Tracts comprising the Orchard Valley mine property include:

Property Description	Acres
Federal Coal Lease C25079 comprised of tracts in sec. 24, T. 23 S., R. 92 W., Sixth Principal Meridian	310.51
Federal Coal Lease C27432 comprised of tracts in sec. 7 and 18, T. 13 S., R. 91 W., Sixth Principal Meridian and in secs. 12 and 13, T. 13 S., R. 92 W., Sixth Principal Meridian	854.03
Fee land leased from M. Pavlisids comprised of tracts in sec. 24, T. 13 S., R. 92 W., Sixth Principal Meridian (coal and surface).	120.00
Total Acreage	1,284.54

Additional Federal lands are contiguous to Federal Coal Lease C27432.

Coal in the Grand Mesa coal field occurs in two members of the Mesaverde Group of Upper Cretaceous age. The Lower Coal Member (Bowie Shale Member) generally contains three, and locally four, coal seams over three feet thick, while the Upper Coal Member (Paonia Shale Member) contains three workable coal seams.

Coal seams in the Lower Coal Member are, in ascending order, the "A", the "B", or Somerset, and the "C" or Bear seams. Both the "B" and "C" coal seams are well defined in the Stevens Gulch area (at the Orchard Valley mine) northwest of Paonia. The "B" coal seam, although mined in the past, is badly split into multiple stringers of coal in this area. The "C" coal seam is approximately seven feet thick in the Stevens Gulch area.

The Orchard Valley mine is currently producing from the "D" coal seam in the lower part of the Upper Coal Member, the "D" coal seam is approximately 27 feet thick near the outcrop at the mine, but thins northward to less than 4 feet about one mile beyond the C27432 lease boundary. Both the "C" and "D" coal seams are considered mineable but the "D" seam must be mined prior to any lower coal seams to provide maximum coal recovery.

Strata in the area of the Orchard Valley mine dip N°2 E at 6 to 7 percent (3-1/2° to 4°). Overburden, consisting mainly of interbedded carbonaceous shale and sandstone, ranges in thickness from about 100 feet near the "D" seam outcrop to a maximum of 1,800 feet.

Mining is completely within the "D" coal seam. Only 12 feet of coal is being mined leaving about 12 feet of floor coal and 1 foot of roof coal (for roof support).

Frequent faulting in the Orchard Valley mine has proved to be a major problem. It has caused the abandonment of some mine areas and has resulted in much additional roof support. Shear or slip planes between the "D" coal seam and the overlying shale cause frequent coal spall from the roof. Coal lace cleavage (caused by joint patterns) of the "D" coal seam is very pronounced and causes ready spalling of pillar ribs.

Coal produced from the Orchard Valley mine is classified as high-volatile B bituminous. Average proximate analyses on an as-received basis reported for the "D" coal seam are as follows:

Moisture	12.61%
Volatile matter	36.08%
Fixed carbon	45.13%
Ash	6.18%
Sulfur	0.40%
Btu/lb	11,353

No reserve information is available from the Orchard Valley mine plans. Until Febraury 19, 1980, Federal Coal Lease C27432 limited production from Colorado Westmoreland, Inc., leases to not more than 700,000 tons of coal per year. This stipulation was removed so that, with mine plan approval, production could be increased to approximately 1.3 million tons per year to meet existing contracts.

Mining is by standard room and pillar mining methods using continuous mining machines with standard auxiliary support equipment. Coal haulage from the face is by shuttle car to a belt feeder and then by belt conveyor to the surface. A nine-entry system is being extended through the leases with entries on 100-foot centerlines. The entries (20 feet wide by 10 feet high) are designed with a 200-foot barrier separating one set of 4 entries from a second set of 5 entries. This plan has been found to provide adequate ground control in on-going operations at the mine. After development, panels are being mined in sequence updip.

Coal is trucked from the Orchard Valley mine to a unit-train loading facility north of Paonia on the North Fork Spur of the Denver and Rio Grande Western Railroad. Northern Indiana Public Service Company receives 600,000 to 700,000 tons of coal per year from the Orchard Valley mine. Their 5-year contract began in 1977.

Production Capability Analysis

Colorado Westmoreland has been plagued with production problems caused by faulting and by an inability to keep enough reserves developed ahead of mining. In part, the second problem is a result of the first problem.

The faulting in the Orchard Valley Mine takes the form of both major block displacements, 20 to 30 feet vertical movement in some cases, as well as a finer faulting and jointing that causes support problems with both the back and the ribs. The impact of these problems on mining operations and coal recovery is evidenced by the fact that of the 28 million tons of in-place reserves for the D seam, only 18 million tons is considered to be minable. Actual recovery from the 18 million tons of minable coal is only 31 percent or 5.6 million tons. The 5.6 million tons of recoverable coal is only 20 percent of the in-place reserves.

The poor recoveries are also a result of the thickness of the D seam. Currently the company is taking a 12-foot mining thickness and leaving one foot of the top coal and 12 feet of bottom coal. The top coal is being left to help support the weak shales that make up the back but the bottom coal is being left for the lack of a feasible way to recover it. It is not inconceivable that if mining operations could be started all over again, that a multi-lift longwall operation would have solved the support problems and increased the overall recovery rate by a factor of 2 or 3.

Colorado Westmoreland has had considerable interaction with various Federal agencies concerning selection of the portions of the LMU it could produce from and what the production rate could be. These problems began with the fact that the company got caught in the web of the NRDC vs. Hughes lawsuit. One of the amended provisions of the interim court order was that the Orchard Valley LMU could produce at no more than 700,000 tons per year. At the time this action came down, the company had already signed an agreement with the Northern Indiana Public Service Company to deliver 1.25 million tons of coal per year.

The legal aspect of the production bottleneck has been resolved and the company has been given authority to go to the higher production rate. However, there has been considerable local pressure against the higher production rate because of the resultant increase in coal truck traffic on state route 133. It has been estimated that the higher production rate will cause the number of truck trips per year to increase from 17,000 to 28,000. The company's proposed solution to the traffic problem is the construction of an overland conveyor that would move the coal from the portal to the unit train loadout facility on the North Fork spur of the Denver and Rio Grande Western Railroad. Now that this solution has been accepted by the government and the public in principle, the company has taken the position that the 5.6 million-ton recoverable reserve base will not support the $9 million investment required for the conveyor construction.

There are no unusual environmental problems associated with the operation of the mine other than the above-mentioned heavy coal truck traffic on a well-used state highway. There will undoubtedly be some subsidence of the ground overlying the mine as a result of mining operations. However, most of this land is extremely rugged terrain with the highest order use being grazing. Surface facilities for the mine include a preparation plant for coal crushing and sizing. This plant is equipped with dust contain-equipment. There is no indication that coal mine drainage into streams is a problem.

Diligent Development Analysis

The requirements for diligent development and continuous operation do not pose a problem for the Orchard Valley Mine. The company's problem is more a matter of obtaining the additional recoverable reserves that are required to support the necessary capital investment for the overland conveyor and other facilities that are required to increase the production rate to support the markets the company has already developed.

STATE: COLORADO **REGION:** UINTA **COUNTY:** DELTA

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
ORCHARD VALLEY MINE	COLORADO WESTMORELAND, INC.	C25079 C27432	1,284.54	310.51 854.03	120	U/G	Approved 3-29-78	1.3 TPY *

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 28.5

RECOVERABLE: 5.6

SOURCE: BLM

ASSOCIATED LEASES WITH REASONS WHY: C25098 APPLICATION

All Figures Shown In Million Tons

COMMENTS: * FEDERAL LEASE C27432 LIMITED PRODUCTION OF FEDERAL LEASES TO 0.7 TPY. THIS STIPULATION WAS REMOVED FEB., 1980 SO PRODUCTION CAN BE INCREASED TO MEET EXISTING CONTRACTS OF 1.3 TONS PER YEAR (WITH MINING PLAN APPROVAL).

NO INFORMATION GIVEN IN MINING PLAN ON RESERVES.

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: UINTA COUNTY: DELTA

MINE NAME (OR LEASE BLOCK): ORCHARD VALLEY

LESSEE(S) (OR OPERATOR): COLORADO WESTMORELAND, INC.

NUMBER OF LEASES IN BLOCK OR PLAN: 2

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	"D"	"C"						
FORMATION	UPPER COAL MBR MESAVERDE GR	LOWER COAL MBR MESAVERDE GR						
RANK	hvBb	hvBb						
THICKNESS	4'-27'	7'						
Btu/LB	11,353	11,821						
SULFUR (%)	0.4	0.41						
ASH (%)	6.18	6.67						
MOISTURE (%)	12.61	9.38						
FIXED CARBON (%)	45.13	47.96						
VOLATILE (%)	36.08	36.00						
SEAM DEPTH	100-1800'							
IN-PLACE RESERVES	28.5							
RECOVERABLE RESERVES	5.6							
RECOVERY RATE	20							

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL			28.5	BLM
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND	5.6		5.6	BLM

NOTES: LOW RECOVERY RATE FOR THICK SEAM, MINING MAX OF 12 FEET OF SEAM "D"

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** UINTA **COUNTY:** DELTA

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	
ORCHARD VALLEY MINE	COLORADO WESTMORELAND, INC	2	DATE MINE OPENED: DEC., 1976 PROJECTED CLOSING DATE: 1987 REMAINING MINE LIFE: 8

REMAINING RECOVERABLE RESERVES:
FEDERAL: 5.6
NON-FEDERAL:

MINE DESIGN CAPACITY
RECOVERY RATE: 20(1)

CUMULATIVE PRODUCTION TO 1979: .920
1979 ACTUAL PRODUCTION: .674 ACLDS

MINE PLAN PROJECTED PRODUCTION BY YEAR:		TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	(2)	0.7		
1981		0.7		0.6 TO 0.7 TONS PER YEAR
1982		0.7		OVER 15-YEAR CONTRACT TO
1983		1.0		NORTHERN INDIANA PUBLIC
1984		1.3		SERVICE COMPANY, BEGAN JULY 1977
1985		↓		
1986				
1987				
1988				
1989				
1990		1.3		
Post 1990				

NOTES: (1) SEAM IS THICK AND RECOVERY EXPECTED TO BE LOW FOR THE RESOURCE
(2) POSSIBLE EXTENSION OF MINE LIFE INDICATED UPON OBTAINING FED LEASE APPLICATION

All Figures Shown in Million Tons

PRODUCTION SUMMARY

RED CANYON NO. 2
GRAND MESA COAL COMPANY
MAP LOCATION C - 14
FEDERAL COAL LEASE D036906
DELTA COUNTY, COLORADO

The Red Canyon No. 2 mine is currently owned and operated by Grand Mesa Coal Company, formerly Belden Enterprises. Grand Mesa is mining on Fee lands and intends to start on the Federal lease when the permit is approved. The mine site is located three and a half miles NW of Cedaredge, Colorado.

Property Description	Acres
Federal Coal Lease D036906 comprised of Lot 7 (SW 1/4 SW 1/4) sec. 12, T.13 S., R.95 W.	41.29
Fee lands owned by Grand Mesa Coal Company	100.00

The surface is owned by Grand Mesa Coal Company and D. W. Moore of Cedaredge, Colorado. Grand Mesa plans to apply for a Federal lease on 80 acres in sec. 11 in order to mine the coal.

The coal seams to be mined are in the Mesaverde Formation of Cretaceous Age. This formation is a hard, medium-grained to fine-grained sandstone with minor interbedded shale layers. The dip of the beds in the mine locality is 3° to the northwest. Under the 140 acres planned for the Red Canyon mine, there are 5 seams considered mineable. The proposed mine plan calls for mining of the D seam within the Federal lease, however, where the overlying E seam has not been mined, there are indications they plan to mine it in advance of the D seam to recover the reserves. Investigations indicate that the area is free of geological faults and the Red Canyon Mine has no known faults. The overburden is 800 feet and subsidence is not expected to occur to any great extent, however, it will be monitored.

Coal obtained from this mine will be utilized as lump coal for local markets and potentially as steam coal. Grand Mesa plans to mine all upper seams if they are of sufficient thickness to justify removal. The current plans for mining the D seam may include mining of the E seam ahead of the D seam. There may not be justification as the E seam is 4 feet thick and the D seam ranges in thickness from 10 to 12 feet. The top 18-24 inches of the D seam is too bony for marketing, therefore the lower 8 to 9 feet of coal below the bone will be mined.

Ore reserve estimates from correlation of a drill hole and the outcrops have indicated a possible 10,000,000 tons in-place for all 5 seams indicated as follows:

Tons of Coal

Seam	In-Place	Indicated	Total
E	80,000	350,000	430,000
D	1,700,000	820,000	2,520,000
C	1,300,000	570,000	1,870,000
B	2,900,000	900,000	3,800,000
A	870,000	330,000	1,820,000
Total	6,850,000	2,970,000	9,820,000

The analysis of the cores indicate the seams are continuous and consistent, the indicated reserves are beyond the drill hole area.

Utilizing an extraction rate of 50 percent, the potential recoverable coal reserves are 5,000,000 tons, but there is an indication that the C and B seams may be stratigraphically close and the C seam may not be mined.

Average analysis for the B, C, D, and E seams were obtained from seven mines within the district and are as follows:

Moisture content	14.0%
Volatile matter	38.0%
Fixed carbon	51.0%
Ash	7.0%
Sulfur	0.65%
Btu/lb	11,000 (as received)

A sample from the E seam from the Red Canyon Mine had the following proximate analysis:

Moisture	3.15%
Volatile matter	43.23%
Fixed carbon	49.01%
Ash	4.61%
Btu/lb	12,245

In the mining procedure, the D seam will be exposed by excavating an area in the canyon to a level at the bottom of the coal seam. The width is expected to be wide enough for six entries, designed for long range mining on both sides of the entries and extending into the mountains. During phase one of the operation, portals will be driven in, supported and ventilation established. Phase two of the operation will be to mine in the portals and start production of coal in the six main entries. Most of the entries and crosscuts will be on 80-foot centers with a 8- to 9-foot height, and 18-foot widths. During phase two, tracks, belt haulage, power, water and other support equipment will be installed.

Mining of two sections will continue unless a contract for more coal is signed and additional leases are acquired. Actual operations will be done by either of two methods, depending upon the type of coal needed by the customers. Continuous miners will be utilized if the end product is lump coal. Loading and hauling will be by conventional rubber tire diesel equipment. Coal will be moved to the surface by continuous belt conveyor. By estimate of Grand Mesa Coal Company, in the first year they could mine 100,000 tons, in the second year they could mine 300,000 tons and by the third year they could mine 400,000 tons. As of this date, there has been no mention of a market for the coal from the mine.

The major reclamation requirements will occur upon exhaustion of the mineral resources of the mine.

With an expected mine life of 20 years or more, the start date of reclamation will depend on the market for the coal, the greater the demand, the sooner the reclamation begins. It is estimated that over the mine life that no more than 10 acres will be disturbed.

STATE: COLORADO **REGION:** UINTA **COUNTY:** DELTA C

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
RED CANYON No. 2	GRAND MESA COAL COMPANY	DO36906	140	41.29	100	U/G	UN-APPROVED	0.4 TPY

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 10.0

RECOVERABLE: 5.0

SOURCE: MINE PLAN

All Figures Shown In Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: UINTA COUNTY: DELTA

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
RED CANYON NO. 2	GRAND MESA COAL CO.	1	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	E	D	C	B	A			
FORMATION	MESA VERDE	→	→	→	→			
RANK								
THICKNESS	4'	10-12'						
Btu/LB ①	12,245	11,100	→	→				
SULFUR (%)	0.65 AVE	0.65	→	→				
ASH (%)	4.61	7.0	→	→				
MOISTURE (%)	3.15	14.0	→	→				
FIXED CARBON (%)	49.01	51.0	→	→				
VOLATILE (%)	43.23	38.0	→	→				
SEAM DEPTH								
IN-PLACE RESERVES	0.43	2.52	1.87	3.8	1.82			
RECOVERABLE RESERVES								
RECOVERY RATE	50	50	50	50	50			

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			10.0	MINE PLAN
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND	2.5	2.5	5.0	MINE PLAN

NOTES: ① COAL ANALYSIS FOR SEAMS B, C, D ARE AN AVERAGE OBTAINED FROM SEVEN MINES IN THE AREA.

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** UINTA **COUNTY:** DELTA

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	
RED CANYON No. 2	GRAND MESA COAL CO	1	DATE MINE OPENED: 1989 PROJECTED CLOSING DATE: 2010 ± ~~REMAINING~~ MINE LIFE: 20 + YEARS

REMAINING RECOVERABLE RESERVES:
FEDERAL: } 5.0
NON-FEDERAL: }

MINE DESIGN CAPACITY 0.4 TPY
RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979: 0.08
1979 ACTUAL PRODUCTION: 0.0

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983			
1984			
1985			
1986			
1987			
1988			
1989	0.1		
1990	0.3		
Post 1990			

NOTES:
1ST YEAR PROD EST. 0.10 TONS PER YEAR
2ND YEAR " " 0.30 " " "
3RD YEAR " " 0.40 " " "

All Figures Shown In Million Tons

PRODUCTION SUMMARY

BLUE RIBBON MINE
SUNFLOWER ENERGY CORPORATION
MAP LOCATION C - 15
FEDERAL COAL LEASE: C033301
DELTA COUNTY, COLORADO

The Blue Ribbon Mine is on leased property in the Somerset coal field located about five miles northwest of Somerset, Colorado. The site lies in the northwest portion of the Paonia coal district, just north of the north fork of the Gunnison River.

Property Description	Acres
Federal Coal Lease C033301 in sec. 35 of T.12 S., R.91 W., Sixth Principal Meridian	625.13
Fee land in sec. 2 of T. 13 S., R. 91 W., Sixth Principal Meridian	125.2
Total Acres	750.33

Total mine plan encompasses 210.2 acres, 85 of which is Federal lands.

Geology in the mine site area exhibits a regional dip of approximately five degrees toward the northeast. The coal measures in the area are of Upper Cretaceous age and are located in the Mesaverde Formation. The coal bed which will be mined is the E seam or Hawksnest seam of the "Upper Coal Member" of the Mesaverde Formation. The E bed is interbedded with shaly sandstone and is approximately six feet thick in the lease area.

The roof and floor rock consists of a competent shaly sandstone. There are no known geologic hazards with the exception of an occasional mud slide during a wet spring.

The E seam has an average thickness of six feet. A typical analysis (as received basis) follows:

Ash	3.8%
Sulfur	0.5%
Volatile matter	40.3%
Fixed carbon	54.7%
Btu/lb	13,030

Recoverable reserves on the E seam are estimated at 900,000 tons. Of this total, 490,000 tons are on Federal lease C033301 and 410,000 tons on fee lands.

The underground mine is developed from the portal bench area via three parallel main entries driven due east. The mine will be developed by room and pillar methods utilizing conventional coal mining equipment. The Federal lease tract will be developed by a three entry system driven at 90 degrees to the main entry system heading due north and splitting the lease tract into two nearly equal halves. This tract will be divided into six nearly equal production panels; three of which will be on the eastern half and three on the western half. One-hundred and fifty-foot wide barrier pillars will separate the production panels from the north-south development entries which provide access to the lease tract. Sixty-foot barriers pillars will separate and protect the production panels.

Within the production panels, rooms will be driven 18 feet wide on 80-foot centers with crosscuts driven 18 feet wide on 80-foot centers. This will leave pillars about 60 feet square after initial mining. The pillars will be robbed utilizing safe secondary mining techniques on a retreat system. Within the panel, the recovery is expected to be about 92 percent with the overall resource recovery about 70 percent. Because of the competent roof structure, the entire bed thickness will be mined. Possible annual production is estimated at 104,000 tons per year utilizing two shifts at 200 tons per shift.

Production Capability Analysis

The Blue Ribbon Mine has been designed as a relatively small, short-lived mining operation. In essence, the operators have made the decision to acquire control of only the "E" seam and once the coal is mined from this seam to cease operation. Their extraction of coal on this basis from a federal coal lease where there are potentially five economically recoverable seams can be considered acceptable because they are mining only the top-most seam. Therefore, the resulting subsidence should not affect the ability of another operator to extract coal from the remaining seams at some time in the future.

There is not conclusive information available but there is an indication that the compilation of reserves for the Blue Ribbon LMU is somewhat low. The company has included approximately 210 acres in the mine plan out of a total of 750 acres that is within its control. If the seam thickness of 6 feet is as consistent as indicated in the mining plan, then the total in-place reserves would be approximately 2,300,000. Applying the overall recovery factor of 70 percent given by the company, then the recoverable coal tonnage would be 1,610,000 tons. This figure is significantly higher than the 900,000 tons stated by the company.

Given the above average mining conditions that exist in the Blue Ribbon Mine, the company should have no difficulty in maintaining the two continuous miner shifts per day. The 200 tons per miner shift that is assumed is extremely conservative and should, therefore, allow for considerable inefficiency in the operation. If is more than likely that the real production bottleneck will be the use of the shuttle car to carry the mined coal the entire distance from the miner to the tipple. For this reason, the company's considered intention to install conveyor haulage should be implemented early in the life of the mine.

Since the operation is largely contained underground and there is no coal preparation plant, there should be no signifianct adverse environmental impact during the life of the mine. The company has stated its intention to totally reclaim the area when mining operatons have been completed. This will include sealing the mine openings, removing all surface facilities, grading and reseeding.

Because of the limited production rate trucks will be used exclusively to transport the coal to currently identified local markets. If more remote markets are developed, then it is assumed that the trucks will move the coal to the nearest available rail loadout facility and the coal will be railed the remaining distrance to market.

Diligent Development Analysis

At the currently stated production rate, the identified recoverable reserves will be mined out in less than 10 years. Therefore, there should be no difficulty in the company meeting diligence and continuous operation requirements.

STATE: COLORADO **REGION:** UINTA **COUNTY:** DELTA

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
BLUE RIBBON MINE	SUNFLOWER ENERGY CORPORATION (SUBLEASED from U.S. STEEL CORP)	CO33301	210.2	85.0	125.2	U/G	Submitted M.P.	0.258

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 2.3

RECOVERABLE: 1.6

SOURCE: I.C

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY: CO33302 DO52504 - ALL THREE LEASES ARE LEASED TO U.S. STEEL UNDER THE SOMERSET MINE PLAN

COMMENTS:

BLUE RIBBON MINES ONLY THE "E" SEAM.

SUNFLOWER ENERGY SUBLEASES 80-85 ACRES FROM U.S. STEEL, U.S. STEEL RETAINS THE REMAINING FOR SOMERSET.

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: UINTA COUNTY: DELTA

MINE NAME (OR LEASE BLOCK): BLUE RIBBON

LESSEE(S) (OR OPERATOR): SUNFLOWER ENERGY CORP

NUMBER OF LEASES IN BLOCK OR PLAN: 1

MINING METHOD: U/G ROOM & PILLAR

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	E							
FORMATION	Mesa Verde							
RANK	Bit.							
THICKNESS	6'							
Btu/LB	13030							
SULFUR (%)	0.5							
ASH (%)	3.8							
MOISTURE (%)								
FIXED CARBON (%)	54.7							
VOLATILE (%)	40.3							
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES	.900							
RECOVERY RATE	70							

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL			2,3	I.C
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			1.6	IC

NOTES:

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** UINTA **COUNTY:** DELTA

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	DATE MINE OPENED: 1983 PROJECTED CLOSING DATE: 1999 REMAINING MINE LIFE: 16
BLUE RIBBON	SUNFLOWER ENERGY CORP	1	

REMAINING RECOVERABLE RESERVES:
FEDERAL: .490
NON-FEDERAL: .410

MINE DESIGN CAPACITY 0.258
RECOVERY RATE: 70

CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983	0.03		
1984	0.05		
1985	0.104		
1986	↓		
1987			
1988			
1989			
1990	0.104		
Post 1990	0.896		

NOTES: LITTLE PRODUCTION INFORMATION AND MINE LIFE INFORMATION ARE AVALABLE

All Figures Shown In Million Tons

PRODUCTION SUMMARY

23B, #2

SOMERSET MINE
UNITED STATES STEEL CORPORATION
MAP LOCATION C - 15
FEDERAL COAL LEASES: D052504
C033301
C033302
GUNNISON AND DELTA COUNTIES, COLORADO

The Somerset mine, operated by United States Steel Corporation, is located in the Somerset Coal Field (Paonia coal district) in western Gunnison and eastern Delta Counties, Colorado. The mine lies along the north side of the North Fork Valley of the Gunnison River between Hubbard and Bear Creeks adjacent to the community of Somerset, Colorado. The town of Paonia lies approximately 11 miles to the southwest.

Underground mining is currently being carried out in both fee and Federal coal with the following tracts comprising the Somerset mine property:

Property Description	Acres
Federal Coal Lease D052504 comprised of tracts in secs. 6, 7, and 19, T.13 S., R 90 W., and in secs. 1, 2, 11, 12, and 13, T.13 S., R.91 W., Sixth Principal Meridian	1,921.94
Federal Coal Lease C033301 comprised of tracts in secs. 34, 35, and 36, T. 12 S., R. 91 W., and in secs. 2 and 3, T.13 S., R 91 W., (80 acres in sec. 35, T.12 S., R 91 W., Sixth Principal Meri~~dian~~ adjacent to the Blue Ribbon Mine property was subleased to Sunflower Energy Corp in 1976 and assigned to Blue Ribbon Ltd. in 1977 and included only the Hawk's Nest or "E" coal seam and all coal seams above the "E" coal seam).	625.13

Federal Coal Lease C033302 comprised of tracts in secs. 34, 35, and 36, T.12 S., R.91 W., and in sec. 3, T.13 S., R.91 W., Sixth Principal Meridian	1,548.28
Fee land owned by United States Steel Corporation (includes fee coal and location of portal and mine plant facilities)	acreage not available
Total Acres	4,095.35+

Coal in the Somerset coal field occurs in two members of the Upper Cretaceous Mesaverde Group, the lower Bowie Shale (Lower Coal) Member and the upper Paonia Shale (Upper Coal) Member. Five major coal seams occur within the Somerset property and are, in ascending order:

Bowie Shale Member Coals

The "A" or Old King coal zone occurs immediately above the Rollins Sandstone. It contains one to three thin seams of generally dirty coal with a maximum thickness of 4.8 feet.

The "B" or Somerset coal seam occurs about 120 feet above the Rollins Sandstone in the Hubbard Creek area, but is only 20 to 50 feet above the massive sandstone in the Somerset-Hawk's Nest Creek area. At Somerset, the coal seam is one bed which varies from 16 to 24 feet in thickness. To the west, the seam splits into two coal beds which may be separated by up to 30 feet of rocks. In the Hubbard Creek area, the lower split (the B-1 bed) contains from 14 to 15 feet of coal, and the upper split (the B-2 bed) contains up to 21 feet of coal. The upper portion (12 to 14 feet) of the Somerset of "B" coal seam is the main coal produced at the Somerset mine. The quality of the coal varies within the seam with the upper 12 to 14 feet being suitable for cleaning and use as a coking coal. The lower portion of the seam is high in inherent ash which does not reduce in the cleaning process to produce an acceptable quality coking coal.

The "C" or Bear coal seam occurs 50 to 80 feet above the "B" seam and varies in thickness from 6.5 to 9.7 feet within the leases. The "C" seam is considered to be coking quality and will be mixed in the future. It was mined prior to 1969 on a limited basis but operations were terminated due largely to poor roof conditions.

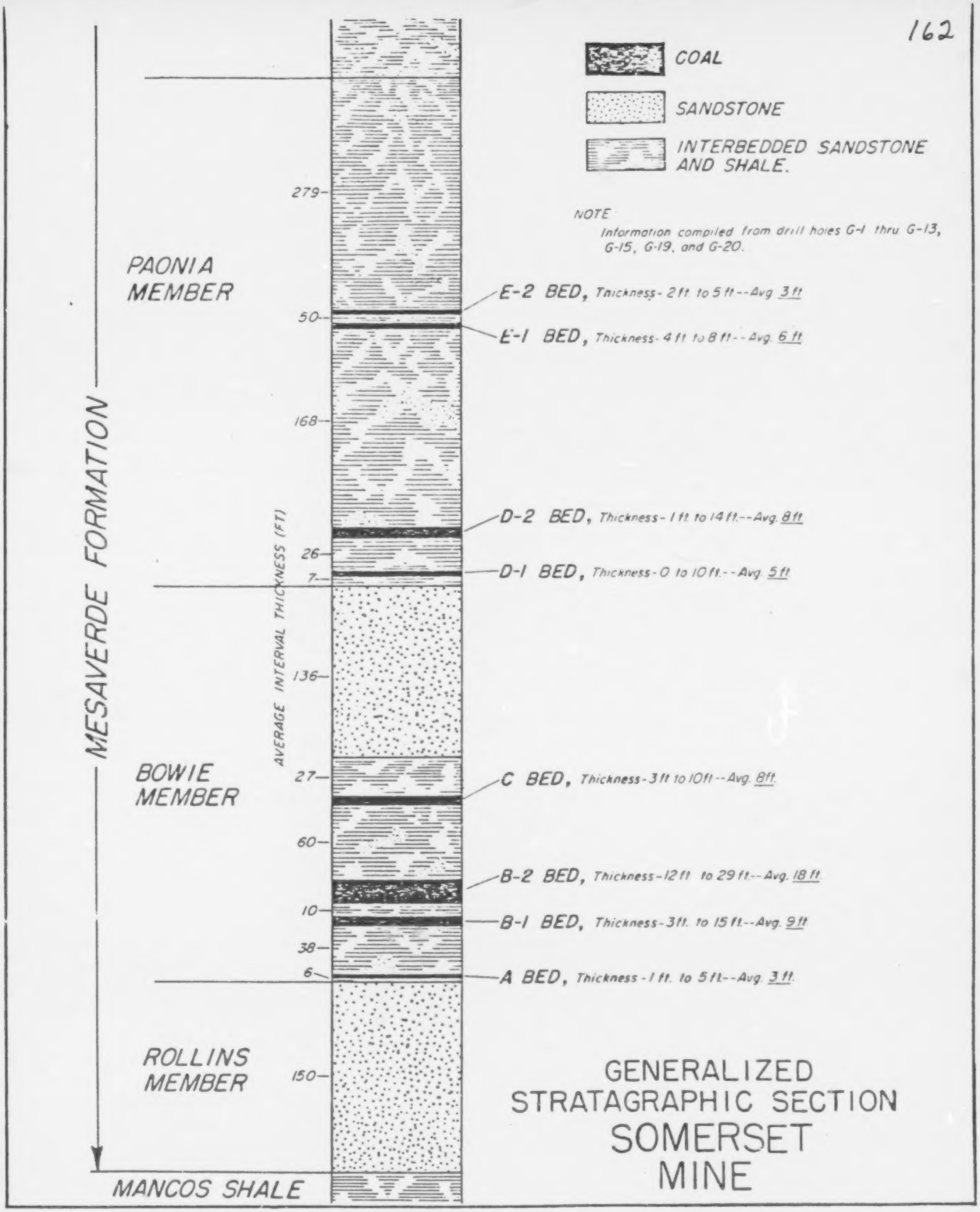
Paonia Shale Member Coals

The "D" or Oliver coal zone is immediately above a massive sandstone marking the top of the Bowie Shale Member. The "D" coal zone is made up of four distinct lenticular coal beds (the "D-1A", "D-1", "D-2" and "D-3" beds) in the Somerset area. The beds are locally thick with the "D-2" bed being most persistent in the lease area. It lies approximately 200 feet above the "C" seam and varies from 6 to 15.7 feet in thickness. It is not of coking quality but is suitable for commercial use. The "D-2" bed outcrops in the lease area.

The "E" or Hawk's Nest coal zone contains 3 correlatable coals, the "E-1", "E-2", and "E-3" beds. The "E-1" bed, 150 to 200 feet above the "D-2" bed, is persistent over the lease area. It varies from four feet to over eight feet in thickness and is the coal mined at the nearby Blue Ribbon mine. It is not of coking quality, but is suitable for commercial use. The "E-1" bed outcrops in the lease area. The "E-2" bed is thin and not of mineable thickness, and the "E-3" bed is not persistent across the lease area.

The formations in the Somerset area dip north-northeast at approximately 3 1/2°.

Geologic hazards in the mine are due to minor faulting in isolated areas and to coal bumps associated with mining underground cover exceeding 1,500 feet. Bad roof conditions have closed some sections of the mine where virtually all methods of roof support have been attempted and failed. Severe methane liberation is also a major problem in the mine.


COAL
SANDSTONE
INTERBEDDED SANDSTONE AND SHALE.
MESAVERDE FORMATION
PAONIA MEMBER
BOWIE MEMBER
ROLLINS MEMBER
MANCOS SHALE
AVERAGE INTERVAL THICKNESS (FT)
279
50
168
26
7
136
27
60
10
38
6
150
E-2 BED, Thickness - 2 ft. to 5 ft.--Avg. 3 ft.
E-1 BED, Thickness - 4 ft. to 8 ft.--Avg. 6 ft.
D-2 BED, Thickness - 1 ft. to 14 ft.--Avg. 8 ft.
D-1 BED, Thickness - 0 to 10 ft.--Avg. 5 ft.
C BED, Thickness - 3 ft. to 10 ft.--Avg. 8 ft.
B-2 BED, Thickness - 12 ft. to 29 ft.--Avg. 18 ft.
B-1 BED, Thickness - 3 ft. to 15 ft.--Avg. 9 ft.
A BED, Thickness - 1 ft. to 5 ft.--Avg. 3 ft.
GENERALIZED STRATAGRAPHIC SECTION SOMERSET MINE

NOTE
Information compiled from drill holes G-1 thru G-13, G-15, G-19, and G-20.

Figure C-10-1. Generalized Stratagraphic Section Somerset Mine (after U.S. Steel Corp.).

Bumping in the "B" seam is generally not severe due to the thick seam. Pillar stress concentrations are relieved through slow heaving of the floor rather than through violent bumps. The "C" seam pillars tend to become highly stressed through pillar loading and have relieved themselves with considerable violence. This type of hazard can be reduced through proper pillar design, mine planning and mining sequence techniques.

Coals from the Somerset mine are classified as high-volatile C bituminous in rank. Typical analyses of coals in the lease area are:

Coal Bed	"B"	"C"	"D-2"	"E-1"
Ash %	7.50	5.90	6.76	4.60
Sulfur %	0.59	0.44	0.50	0.49
Volatile Matter %	37.80	37.00	39.08	38.90
Btu/lb	~~13,500~~	13,500	12,970	13,600

The 1977 mine plan indicated that recoverable reserves in the Somerset mine lease blocks were distributed as follows:

	Recoverable Reserves (1,000 tons)			
Coal Seam	D052504	C033301	C033302	Total
"B"	5,665	4,684	9,638	19,987
"C"	872	2,843	4,300	8,015
"D"	15,000	4,806	10,263	30,069
"E"	1,273	2,002	4,317	7,592
Total	22,810	14,335	28,518	65,663

The production rate of the Somerset mine is determined by the requirements for coking coal at the United States Steel Corporation Geneva Works at Orem, Utah. The production rate for 1977 was 937,000 tons of clean coal and the rate is expected to continue near this level.

Mining is conducted in the "B" seam by conventional room and pillar techniques using continuous miners and shuttle cars. Newly exposed roof is supported by full roof bolting and additional support materials as required by local conditions. Development mining is generally in the upper 8 to 10 feet of the seam and rooms are driven on retreat with extraction of room and entry pillars. About 4 to 6 feet of bottom coal is also mined during the retreat cycle of mining (extracting a total of 12 to 14 feet of the seam).

Coal is loaded at the working faces into shuttle cars which transport the coal to a conveyor belt system. The conveyor belts transport the coal to a mine car loading station. Loaded mine cars are moved to the surface tipple at Somerset by electric powered locomotives over a rail haulage system.

The North Fork Spur of the Denver and Rio Grande Western Railroad along the North Fork Valley provides unit-train transportation for the Somerset mine. Coal is shipped to Wellington, Utah where it is blended with other coal and then washed. It is then shipped to the United States Steel Corporation's Geneva Works at Orem, Utah for use as a high-volatile coking coal at the steel plant.

U.S. Steel has provided the following information on its plans for mining the Somerset leases:

1. Federal Lease D-052504 is currently in production in the B-Seam and is projected to remain in effect for the life of Somerset Mine.

2. Federal Lease C-033301 is currently in production in the B-Seam and is projected to remain in effect for the life of Somerset Mine.

3. Federal Lease C-033302 is projected for production in the B-Seam and is projected to remain in effect for the life of the Somerset Mine.

4. Mining in the upper seams of these leases will depend on the market requirements and prevailing prices as compared to the cost of mining.

Production Capability Analysis

Mining at the Somerset mine is based on the use of a standard room and pillar technique using continuous miners for coal extraction. Current mining operations are limited to the B seam which is the lowermost recoverable seam. This seam contains approximately 20 million of the identified 65 million tons of recoverable reserve for the mine.

Mining operations were initiated in the C seam, the next seam above the B seam, but have now been stopped because of the uncontrollable support problems which were encountered. It is not known whether the company will again attempt mining in this seam at any time in the near future.

Both the B seam and the D seam are thicker seams. Past mining practice in the B seam has been to mine a 12 to 14-foot mining thickness. As much as 10 feet of the coal is left in place. Part of the reason for this is that the lower portion of the seam is not considered to be of metallurgical grade. Since the D seam is estimated to vary in thickness from 6 to 15.7 feet, it may be possible to recover the whole seam. The fact that the coal in this seam is not of metallurgical quality and will have to be sold as steam coal reinforces this idea.

There has been some concern over the fact that U. S. Steel is mining the B seam, the lowermost seam, first. Common practice in multi-seam mining is to mine the topmost seam first and then proceed down through the seams in sequence. This practice avoids the risk that coal in the overlying seams will be lost because of subsidence induced by the mining of a lower seam. U.S. Steel is mining the B-seam because it is of metallurgical quality and meets the requirements of its Utah steel plant.

It is anticipated that the company will have no difficulty in maintaining the current annual production rate of 940,000 tons per year. The company certainly has the resources to expand this rate but current management policy is to produce just enough coal to satisfy the requirements of the Geneva steelworks.

Because the Somerset mine is located adjacent to the North Fork line of the Denver & Rio Grande Western Railroad, there is no difficulty in transporting the mine production to its destination.

There are no significant environmental problems associated with the operation of the Somerset mine. Surface disturbance is limited to land required for the mine support buildings. Subsidence will result from the extraction of the coal but due to the depth of cover it is unlikely that it will extend to the surface.

Diligent Development Analysis

Current plans provide for the existing reserves to be mined out by 2021. Because the Somerset Mine has been in operation for a long time and is a captive operation, no difficulty is foreseen in satisfying diligent development and continued operation requirements on this tract.

Sources: Somerset Mine Plan; West-Central Colorado Environmental Statement; Comments by U.S. Steel on draft mine plan summary.

STATE: COLORADO **REGION:** UINTA **COUNTY:** DELTA AND GUNNISON

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
SOMERSET	UNITED STATES STEEL CORPORATION	C033302 D052504	8187	1548.28 1921.94	4092	U/G	Approved 1-20-78	0.94 TPY

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 65.663

SOURCE: MINE PLAN

All Figures Shown In Million Tons

ASSOCIATED LEASES WITH REASONS WHY: C033301 SUBLEASED TO SUNFLOWER ENERGY CORP. BLUE RIBBON MINE. D052558, C051669 & C068389 ALL LEASED BY U.S. STEEL ARE NEXT TO U.S. STEEL FEE LAND, THIS FEE LAND IS CONTIGUOUS WITH SOMERSET.

COMMENTS: U.S. STEEL IS MINING THE B SEAM FIRST BY CONVENTIONAL ROOM AND PILLAR METHODS THIS HAS CAUSED CONCERN OVER THE FACT THAT THE B SEAM IS THE LOWEST SEAM AND CAVING MAY OCCUR AND LOCK POTENTIAL RESERVES UNDERGROUND.

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: UINTA COUNTY: DELTA AND GUNNISON

MINE NAME (OR LEASE BLOCK): SOMERSET

LESSEE(S) (OR OPERATOR): U.S. STEEL CORP.

NUMBER OF LEASES IN BLOCK OR PLAN: 3

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	E-1	D-2	C	B(-2)				
FORMATION	MESA VERDE	MESA VERDE	MESA VERDE	MESA VERDE				
RANK	hvCb	hvCb	hvCb	hvCb				
THICKNESS	4'-8'	6'-15.7'	65'-9.7'	16'-24'				
Btu/LB	13,600	12,970	13,500	13,500				
SULFUR (%)	.49	.5	.44	.59				
ASH (%)								
MOISTURE (%)								
FIXED CARBON (%)								
VOLATILE (%)	38.9	30.07	37.0	37.8				
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES	7.592	30.069	8.015	19.987				
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			65.663	MINE PLAN

NOTES: B & C SEAMS ARE OF COKING QUALITY

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** UINTA **COUNTY:** DELTA & GUNNISON

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	
SOMERSET	U.S. STEEL CORP.	3	DATE MINE OPENED: 1976 PROJECTED CLOSING DATE: 2021 REMAINING MINE LIFE: 41

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY 0.94

RECOVERY RATE: ± 40%

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	.898		
1981	↓		CAPTIVE - U.S. STEEL GENEVA
1982	↓		WORKS - OREM, UTAH
1983	↓		
1984	↓		
1985	.898		
1986	.598		
1987	.901		
1988	↓		
1989	↓		
1990	.901		
Post 1990	22.513		

NOTES: CO33302 WILL NOT BE IN PRODUCTION UNTIL 1986.

All Figures Shown in Million Tons

PRODUCTION SUMMARY

24A, #3

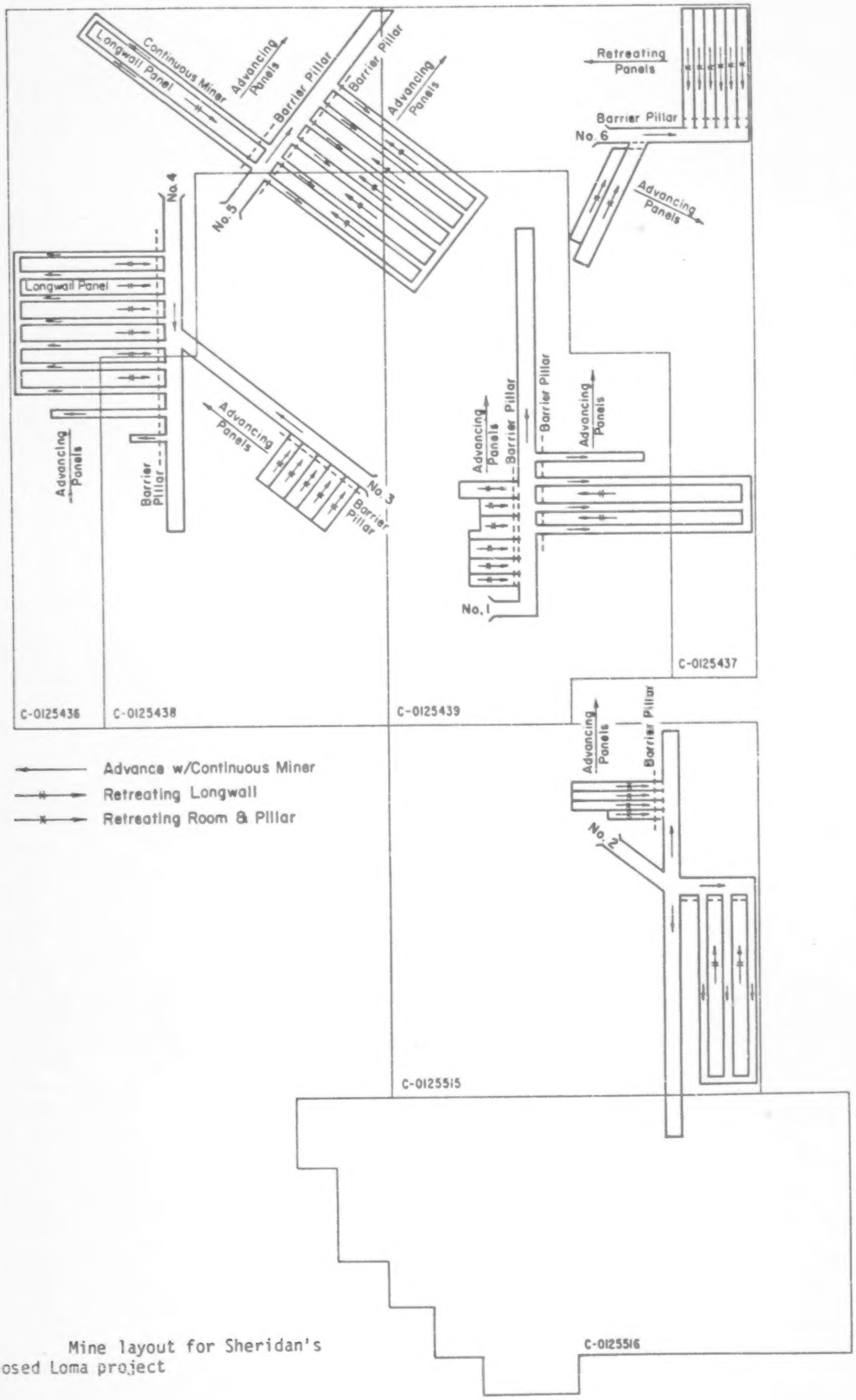
LOMA PROJECT
MCCLANE CANYON AND MUNGER CANYON
SHERIDAN ENTERPRISES, INCORPORATED
MAP LOCATION C - 16

FEDERAL COAL LEASES: C0125436 (2,446.19 Acres)
C0125437 (2,357.46 Acres)
C0125438 (2,560.00 Acras)
C0125439 (2,482.98 Acres)
C0125515 (2,559.98 Acres)
C0125516 (2,522.72 Acres)
GARFIELD COUNTY, COLORADO

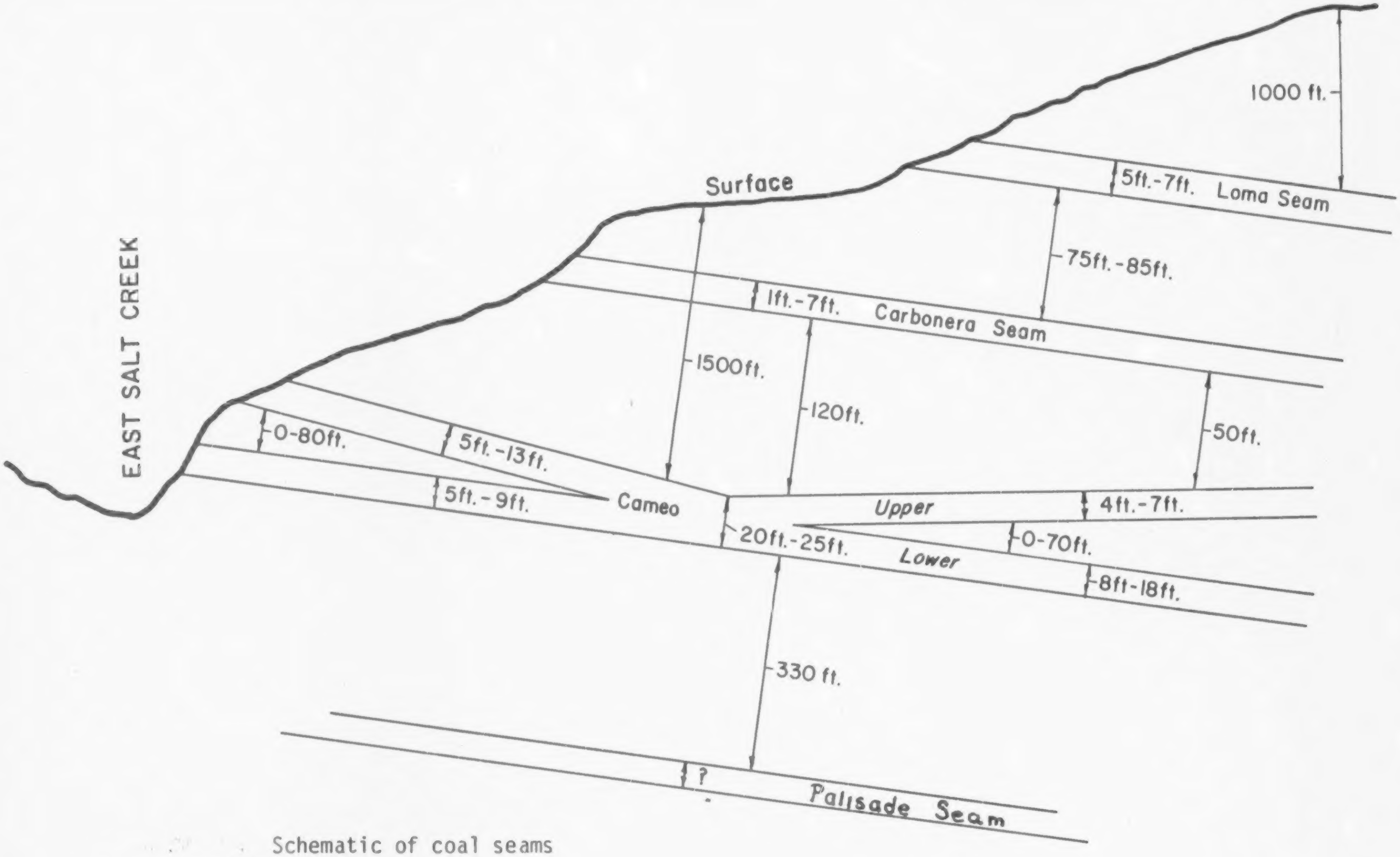
The Loma project is located about 35 miles northwest of Grand Junction, Colorado, 20 miles north of Loma, Colorado. The project consist of 6 Federal leases that total 14,929.33 acres; the Douglas Pass Road splits the mining area, providing the main access to and from the specific mines.

The Loma project will eventually consist of 6 new underground mines, the anticipated production when all the mines are operating is 5,000,000 tons per year of bituminous coal.

Sheridan Enterprises, Inc. (SEI) has started the exploration in two of the prospective mines, the McClane Canyon mine and the Munger Canyon mine. These mines are listed as separate mines by the Office of Surface Mining, but they are part of the overall Loma Mining Plan. When the exploration license was applied for from the USGS, a mining and reclamation plan was submitted. Two separate mine plans were submittted to state and federal authorities for appproval. The mine plans reveal how SEI plans to sample and test the coal and the mine area. The test sites are planned to eventually become the active mine portals. The McClane Canyon and Munger Canyon mines are part of the larger Loma Complex, which will include six mines. The mines will use a central processing facility the leases are all contiguous, and the mine layouts show that the mines cross over the borders of individual leases.


Continuous Miner
Longwall Panel
Advancing Panels
Barrier Pillar
Barrier Pillar
Advancing Panels
No. 5
No. 4
Longwall Panel
Retreating Panels
Barrier Pillar
No. 6
Advancing Panels
Advancing Panels
Barrier Pillar
Advancing Panels
No. 3
Barrier Pillar
Advancing Panels
Barrier Pillar
Barrier Pillar
Advancing Panels
No. 1
C-0125437
C-0125436
C-0125438
C-0125439
Advancing Panels
Barrier Pillar
No. 2
Advance w/Continuous Miner
Retreating Longwall
Retreating Room & Pillar
C-0125515
C-0125516

Mine layout for Sheridan's proposed Loma project


1000 ft.
Surface
5ft.-7ft.
Loma Seam
75ft.-85ft.
EAST SALT CREEK
1ft.-7ft.
Carbonera Seam
1500ft.
120ft.
50ft.
0-80ft.
5ft.-13ft.
5ft.-9ft.
Cameo
Upper
4ft.-7ft.
20ft.-25ft.
0-70ft.
Lower
8ft-18ft.
330 ft.
?
Palisade Seam

Schematic of coal seams at proposed Loma project

The Loma project lies near the base of the Little Book Cliffs overlooking the Grand Valley to the south. The East Salt Creek bisects the northern portion of the lease area and the mine portals are to be located up short canyons that drain into the creek. Strata in the lease area dip in a northeasterly direction at around 1° to 3° with a north-northwest strike. Two faults have been located in the area, one parallels the East Salt Creek and the other parallels the Spink Canyon and crosses the Douglas Pass Road.

The principal coal beds through the general area and on the Federal leases occur in the lower part of the Mount Garfield formation of the Mesaverde Group and possibly in the Anchor Mine Tongue of the Mancos shale.

The Mount Garfield formation contains four coal seams, In ascending order, they are the Palisade, the Cameo, the Carbonera, and a seam which Sheridan calls the "Loma seam" for idenfication purposes. The Palisade coal seam lies just above the Sego sandstone, the bottom member of the Mount Garfield Formation.

The in-place reserves are estimated to be 282,000,000tons of coal with approximately 100,000,000 tons of coal recoverable using a 40 percent recovery factor. Coal quality, by seam, are expressed below:

WEIGHTED AVERAGE ANALYSIS
(As-Received)

Seam	Lower Cameo	Upper Cameo	Carbonera	Loma
% Moisture	9.08	10.96	9.38	8.8
% Ash	15.22	11.00	15.90	17.69
% Volatile Matter	32.57	34.08	34.44	33.26
% Fixed Carbon	42.76	43.94	42.47	40.25
% Sulfur	0.48	0.49	0.55	0.94
Btu/lb	10,626	11,056	10,438	10,366

The coal is ranked as high volatile C bituminous

The initial development of the main entries of each mine would begin at the coal outcrop. Mine portals are proposed at the locations shown on the mine layout map.

Development of the main entries would utilize a five-entry system. The outside two entries would be utilized as main ventilating returns, allowing a split ventilation system. The inner three entries would be used for fresh intake air, main belt conveyor, haulageway for materials, and miner access.

Development of the bleeder system entries would utilize three and four entries with one entry as a return airway, one as a belt conveyor entry, and one or two entries for fresh air intake, materials haulage, and access.

Development for both longwall panels and room-and-pillar panels would utilize a three-entry system which would provide for a return airway, belt conveyor entry, intake airway, material haulage, and access.

Adequate barrier pillars, 100 to 200 feet in width, would be provided to protect the bleeders and main entries. All entries would be 18 to 20 feet wide on 70- to 90-foot centers, with crosscuts on 100-foot centers for the full seam thickness up to a maximum of 12 feet of coal. Higher entries could create rib spall and roof control problems. All development work would be accomplished with continuous miner units.

Longwall mine panels would employ a retreat mining method with longwall shearing beginning at the barrier pillar of the bleeder entries and mining toward the main entries. Panel lengths would vary from 5,000 to 7,000 feet with face widths varying from 500 to 600 feet. A maximum height of 14 feet is proposed for longwall mining.

Room and pillar mining would be accomplished by continuous miner units. Panel entries would be driven off the main entries at intervals, to provide rooms 340 feet long on one side of the panel entries. The rooms would be mined 20 feet wide on 45-foot centers to room depth (length); pillars would be extracted on retreat. Full seam thickness would be mined to a height of 12 to 14 feet.

Each of the mines would have, at one time, up to five mining units, that is, up to four continuous miners and one longwall unit.

Coal would be transported from a working face to the main underground conveyor belt by diesel powered shuttle cars. From the conveyor belt, the coal would enter a surge bin on the surface, then be transported to the central processing facilities by 55-ton coal haulers.

The on-site haul roads that would be used for coal haulage from the various mine-portal areas to the central processing facilities would be graveled roads, 50 feet wide. Those roads that would be used for both coal haulage and for refuse disposal would be graveled roads, 80 feet wide.

The central processing facilities would disturb approximately 13.2 acres. These facilities would include a coal processing plant, 20,000- ton raw coal storage area, 20,000-ton clean coal storage area, 20-foot diameter refuse bin, railroad loadout facility, crushing unit, conveyor system, water supply and treatment facility, sewage treatment facility, bathhouse, power distribution system, and parking area.

The main access road to the Loma project is Colorado Highway 139 (Douglas Pass Road) from Loma, Colorado. Primary access to the project would be over graveled roads, a minimum of 30 feet wide.

The 200-foot railroad and utility corridor for the Loma Project would start approximately 1 mile west of Mack, Colorado. The corridor would contain the railroad spur, power line, and water line. It would follow the East Salt Creek drainage, extending approximately 20.5 miles to the loadout area of the project. Approximately 497 acres would be disturbed.

Abandonment of the Loma project at the completion of mining would consist of removing all structures, pads, temporary diversion structures, and sedimentation ponds; regrading and recontouring all affected areas to approximately the original contour; and scarifying these areas. The topsoil would be replaced, fertilized if necessary, and seeded by seed-drill or broadcasting with an approved seed mixture. All portals would be sealed in accordance with applicable Federal and State requirements. The area would be returned to its former use in a manner that is suitable to that use as required by 30(CFR):700.

Sheridan Enterproses and Colorado-Ute Electric Association announced plans to form a joint venture for development of the Loma Project mines. Sheridan Enterprises would be the managing partner for the project. Coal from the mines would be available for use at Colorado-Ute Electric Association plants with rail oonnections with the Loma mines and would also be sold to other purchasers. Colorado-Ute plans to build a new 2 unit generating plant which would use up to 2.8 million tons per year from the McClane Canyon and Munger Canyon mines. Power from these plants would serve customers in the Western Colorado area.

Source: West-Central Colorado Environmental Statement and Sheridan Enterprises.

STATE: COLORADO **REGION:** UINTA **COUNTY:** GARFIELD

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
LOMA COMPLEX	SHERIDAN	C0125436		2,446.19			MUNGER submitted	2.8 mmtPY
McCLANE CANYON No. 1 MINE	ENTERPRISES, INC.	C0125437		2357.46		U/G		
		C0125438	14,929.33	2,560.00			McCLANE submitted	
MUNGER CANYON No. 2 MINE		C0125439		2,482.98				
		C0125515		2,559.98				
		C0125516		2522.72				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 282

RECOVERABLE: 100.0 (1)

SOURCE: MINE PLAN

All Figures Shown In Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS: (1) Reserves for 1 total lease area over 6 possible mining sites

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: UINTA COUNTY: GARFIELD

MINE NAME (OR LEASE BLOCK): LOMA

LESSEE(S) (OR OPERATOR): SHERIDAN ENTERPRISES

NUMBER OF LEASES IN BLOCK OR PLAN: 6

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	PALISADE	CAMEO	CARBONERA	LOMA				
FORMATION	MT GARFIELD	〃	〃	〃				
RANK		hvCb	hvCb	hvCb				
THICKNESS								
Btu/LB		10,626-11,056	10,438	10,366				
SULFUR (%)		.48-.49	0.55	0.94				
ASH (%)		11-15	15.9	17.69				
MOISTURE (%)		9-10.9	9.38	8.8				
FIXED CARBON (%)		42.7-43.9	42.47	40.25				
VOLATILE (%)		32.5-34	34.44	33.26				
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			282.0	
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			100.0	M.P.

NOTES: STRATA DIPS 1°-3° two faults present

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** UINTA **COUNTY:** GARFIELD

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	
LOMA	SHERIDAN ENTERPRISES	6	DATE MINE OPENED: 1982 PROJECTED CLOSING DATE: REMAINING MINE LIFE: 30 +

REMAINING RECOVERABLE RESERVES:
FEDERAL:
NON-FEDERAL:
MINE DESIGN CAPACITY 5.0
RECOVERY RATE: 40
CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION: .007

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION *	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	0.02		
1981	0.05		
1982	0.3		0.05
1983	0.75		0.05
1984	0.75		0.05
1985	1.00		1.0
1986	2.00		1.5
1987	2.50		2.00
1988	2.80		2.5
1989	2.80		2.8
1990	[illegible]		2.8
Post 1990	105.0		

NOTES: LONGWALL & ROOM & PILLAR

* This production schedule reflects coal already sold and to be produced in 1985–1990. Production for 1982, 1983 and 1984 will be reduced to 50,000 tons per year if outside sales are not available over contract amounts (per Sheridan Enterprises).

All Figures Shown in Million Tons

PRODUCTION SUMMARY

BEAR MINE
BEAR COAL COMPANY, INC.
ATLANTIC RICHFIELD COMPANY
MAP LOCATION C - 17
FEDERAL COAL LEASE: D044569
GUNNISON COUNTY, COLORADO

The Bear mine, operated by the Bear Coal Company under an agreement with the current assignee, Atlantic Richfield, is located two miles east of the town of Somerset, Colorado. Production is from the Juanita C seam.

Property Description	Acres
Federal Coal Lease D044569 in secs. 9, 16, and 21, of T.13 S., R.90 W., Sixth Principal Meridian	1339.76

Coal in the lease lies within the Upper Cretaceous Mesaverde Formation of the southern Piceance Basin which dips 3° to 5° NNE. The lower coal-bearing member of the Mesaverde Formation contains three mineable seams, the A, B, and the C seams. Bear Coal Company is mining the C seam which varies in thickness from less than 1-foot along the southern lease boundary to a maximum of about 8 feet in sec. 16. Atlantic Richfield is planning to mine the F seam in its Mt. Gunnison Mine. ARCO has no current plans to mine any other seams.

Within the mine, the roof material is reasonably competent but is subject to deterioration when exposed to the cycles of moisture change attendant with mine ventilation and the natural climatic conditions. The floor of the C seam is characterized by 5 to 12 feet of competent shales underlain by a massive sandstone.

The coal contained in the C seam appears to be highly uniform, a typical analysis is as follows:

Moisture	6.12%
Ash	6.55%
Sulfur	0.57%
Btu/lb	12,639

The total estimated in-place reserves under leased areas in sections 9, 16. and 21 are 1,962,400 under an area of 150 acres.

Room and pillar methods are utilized by the Bear Coal Company for the underground mining of the C seam. Coal will be removed from the working face of continuous miners which will feed, by a chain conveyor, waiting shuttle cars. The shuttle cars, in turn, will transport the coal to a belt conveyor which will feed the coal to a waiting underground rail system. Coal is then brought to the surface for processing. Access to the coal was accomplished by driving a single main drift consisting of 5 entries on 84-foot centers. A modified pillar robbing system employed upon retreat should yield recovery rates of 69 percent. The production for the Bear mine is estimated to be 275,000 tons per year and this should continue until ARCO begins operations at Mt. Gunnison .

Production Capability Analysis

The Bear Mine is a small operation with limited remaining reserves. The in-place reserves on the currently approved mining unit total about 1,962,400 tons. In the approved mining plan room spacing is set at 84 feet iwht 18 foot wide entries and crosscuts. Without pillar slabbing or outright pillar removal on retreat, the nominal recovery rate in the mined out areas would be approximately 38 percent. Accounting for the coal that must be left in barrier pillars along the boundaries of the lease, the five entries and the main slope; overall recovery approaches 30 percent. Based on the current annual production rate of 200,000 to 250,000 tons, this recovery rate would indicate a remaining mine life of 3 years. In order to increase reserves and prolong mine life, Bear Coal Company has two options: acquire additional reserves or increase the overall recovery rate. (The mine plan indicates that recovery rates could be raised to about 50 percent by a combination of pillar slabbing and pillar removal.) Neither acquisition of additional reserves or increased recovery appear to be available at present. ARCO has indicated that there are no open federal coal lands adjacent to the Bear Mine and that it intends to limit operation of the Bear Mine once the Mt. Gunnison Mine is active. The possibility of increasing recovery rates by the proposed method is also apparently foreclosed because it could cause significant subsidence and interfere with or prevent recovery of the seams above the C seam. Without additional reserves or approval by USGS and ARCO of a method to increase recovery without jeopardizing minability of other seams, the Bear Mine will exhaust its reserves by 1986 according to its current plan of operations.

There are not any obvious mining or environmental conditions which would prevent the company from mining out its existing reserves. Mining conditions are above average with very good roof and floor conditions and a minimum of problems with water inflows. The environmental impact is minimal because there are only a few buildings and a truck loadout bin located on the surface of the mine area. There has been some problem with the location of a pile of mine waste rock but the company has agreed to move this material to another location.

Transportation of the coal from the property is currently done by 27-ton truck. Because of the limited annual production rate, it is assumed that truck transport will remain in effect over the life of the mine.

Diligent Development Analysis

At its current production rate, the Bear Mine will exhaust its reserves by 1986, therefore there is no concern over compliance with any federal diligence requirements that might be applicable to the contract mining operation. It is not known how much of the past and planned production from the Bear Mine might be credited towards diligent production requirements for the larger Mt. Gunnison Mine planned by the lessee,ARCO.

STATE: COLORADO **REGION:** UINTA **COUNTY:** GUNNISON

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
BEAR MINE (SEE MT. GUNNISON)	ATLANTIC RICHFIELD Co OPERATOR IS BEAR COAL Co under contract,	D044569	1000	1339.76		U/G	12-27-77	0.275 TPY

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 1.9624

RECOVERABLE: 0.981

SOURCE: USGS

ASSOCIATED LEASES WITH REASONS WHY:

All Figures Shown in Million Tons

COMMENTS: Bear Coal Co. submitted a mine plan to extend operations into sections 17 and 20 in November 1979. The expansion would add 1.32 million tons of reserves. Bear Coal Co. mining contract is limited to the "C" Seam and cannot renew the agreement once ARCO has begun operations on the Mt. Gunnison mine. ARCO has indicated that it does not expect the Bear Coal Mine to continue operations into sections 17 and 20.

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: UINTA COUNTY: GUNNISON

MINE NAME (OR LEASE BLOCK): BEAR MINE

LESSEE(S) (OR OPERATOR): ARCO (BEAR COAL CO.)

NUMBER OF LEASES IN BLOCK OR PLAN: 1

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	"C"							
FORMATION	MESAVERDE							
RANK	BIT							
THICKNESS	4'-8'							
Btu/LB	12,639							
SULFUR (%)	0.57							
ASH (%)	6.55							
MOISTURE (%)	6.12							
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES *	1.962							
RECOVERABLE RESERVES	.981							
RECOVERY RATE	50							

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND	1.9624		1.9624	USGS
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			0.981	

NOTES: * BASED ON CURRENT MINEPLAN - SECTIONS 17 AND 20 NOT INCLUDED - INCLUSION OF SEC. 17 & 20 WOULD PLACE IN-PLACE AT 3.094 TONS WITH RECOVERABLE AT 1.547 TONS - SEE NOTE ON PREVIOUS PAGE.

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO REGION: UINTA COUNTY: GUNNISON

MINE NAME OR LEASE BLOCK: BEAR MINE
LESSEE(S): ARCO
NUMBER OF LEASES: 1
DATE MINE OPENED:
PROJECTED CLOSING DATE: 1984
REMAINING MINE LIFE: 4

REMAINING RECOVERABLE RESERVES:
FEDERAL: 0.981
NON-FEDERAL:
MINE DESIGN CAPACITY 0.275 TPY
RECOVERY RATE: 50
CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	0.25		
1981	0.25		
1982	0.225		
1983	0.200		
1984	0.100		
1985			
1986			
1987			
1988			
1989			
1990			
Post 1990			

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

26B, #1

MT. GUNNISON NO. 1 MINE
ATLANTIC RICHFIELD COMPANY
MAP LOCATION C- 17
FEDERAL COAL LEASE C-0117192, C-1362
GUNNISON COUNTY, COLORADO

Atlantic Richfield proposes to establish the Mt. Gunnison underground coal mine on Federal coal leases and private leases located in Gunnison County, Colorado, two miles east of Sommerset, Colorado. The proposed Mt. Gunnison No. 1 mine will be located above the current site of the Bear Coal Company operations.

Property Description	Acres
Federal Coal Lease C011792 comprised of tracts in secs. 17 - 20, T. 13 S., R. 90 W. Sixth Principal Meridian.	1243.49
Federal Coal Lease C1362 comprised of tracts in secs. 27 - 34, T. 13 S., R. 90 W. in secs. 3, 4, 9, 10, T.14 S., R. 90 W. Sixth Principal Meridian	4836.36

The total mine plan area as indicated by ARCO encompasses a total of 12,578 acres, including the Federal leases. This also includes the lease currently being mined by the Bear Coal Company, 1,339.76 acres, on lease D044569.

This portion of the southeast Piceance Basin consists of gently north-northwest dipping beds of sandstone, shale, and coal of upper Cretaceous and early Tertiary Age. The major coal beds are found in the upper Cretaceous Mesaverde Formation. Locally, the Mesaverde is approximately 2,500 feet thick and comprised of, in ascending order, the Rollins Sandstone member and the Barren Member.

27B, #1

The upper coal member contains the D, E and F seams which tend to be lenticular. Six major coal seams are located on the Mt. Gunnison property and are labeled alphabetically in ascending order starting with the A seam and ending with the F seam.

Mining is expected to commence on the uppermost or F seam, by the year 1981. The F seam thickness varies from 4 to 9.6 feet. The E seam varies from 4 to 21 feet in thickness: Mining of the E seam is not currently Planned. The only other seam currently suitable for mining according to ARCO is the B seam. ARCO has has not submitted or prepared mining plans for the B seam.

Geologic data obtained from the drill holes indicate that the average dip of the F seam is 3° to 5° to the NNE with an average thickness of 6.8 feet. The drilling program has also indicated that there are no known faults in the immediate area. An average analysis from the F seam based on core hole data is as follows:

Ash	4.5%
Moisture	7.2%
Fixed Carbon	49.41%
Volatile matter	38.57%
Sulfur	0.45%
Btu/lb	12,597

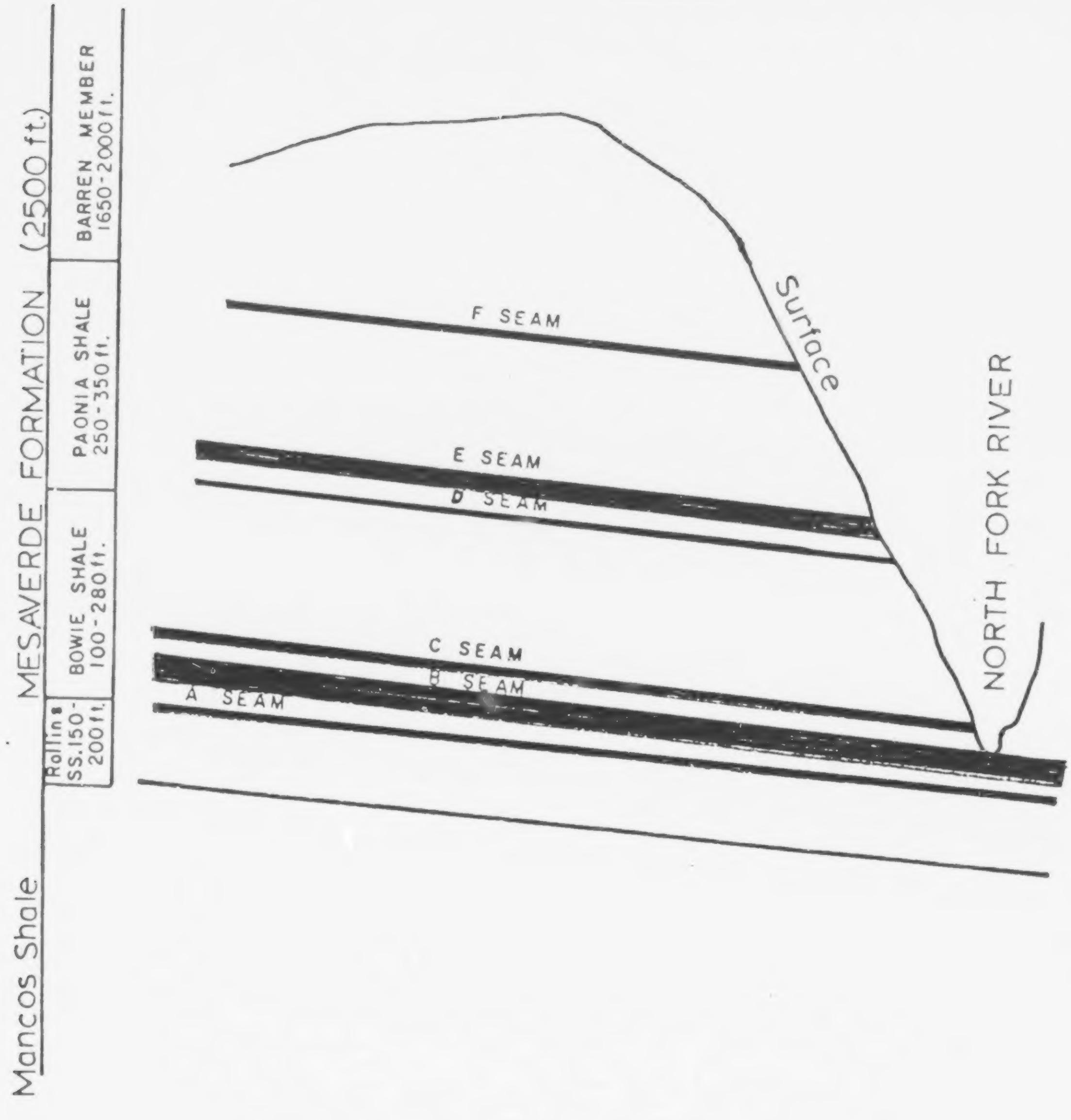
The coal in the area is ranked as high volatile B or C bituminous coking coal.

Earlier mine plan information indicated that the reserve base for the F seam is 118,700,000 tons. Since mining of the F seam has not commenced, this figure is considered accurate. The total mine plan reserves are estimated to be approximately 60,000,000 tons. The lease area has been reported by USGS and others to contain about 470 million tons of in place reserves in all seams.

The mining procedure will start on the F seam using room and pillar as the prime mining method. Five entries will be driven as a panel is developed, one to be used for a conveyor belt for coal transport and four others for ventilation, men, and equipment movement. Continuous miners are to be utilized on the working face and as a miner is loaded, the coal will be transferred to a hauling vehicle and then to a belt conveyor system which moves the coal out of the mine for processing. When a continuous miner has completed a face cut, it is moved to another entry to start again. This allows the roof support equipment ample time to install resin or mechanical bolts into the roof for further advancement of the face.

Planned construction is to start at the beginning of the construction year which means if a permit is approved in 1980, construction begins in 1981. The startup production is estimated to be 250,000 tons per year with a production build-up expected to last ten years until production is 2,800,000 tons per year, contingent upon coal sales.

Recovery of coal in the mains and submains is expected to be 30 percent, panel extraction will range from 48 to 67 percent with and without pillar recovery. Should longwall operation commence, the recovery is expected to range up to 89 percent. Overall E seam recovery is estimated to be on the order of 50 percent.


Mancos Shale
MESAVERDE FORMATION (2500 ft.)
Rollins SS. 150-200 ft.
BOWIE SHALE 100-280 ft.
PAONIA SHALE 250-350 ft.
BARREN MEMBER 1650-2000 ft.
F SEAM
E SEAM
D SEAM
C SEAM
B SEAM
A SEAM
Surface
NORTH FORK RIVER

CO-21

Production Capability Analysis

ARCO has submitted a mining plan for the development of the proposed Mt. Gunnison LMU. The original plan was submitted in November 1979 and a revised version in April 1980. In certain respects the plan submitted is more of a working paper rather than an explicit engineering document detailing its intentions for the development of the M. Gunnison property.

The lack of decisiveness is particularly evident in regard to the proposed method of mining. At one point in the plan there is a rather detailed discussion of the use of continuous miners and the room and pillar method for the extraction of coal from the topmost F seam. This discussion includes specification of the types of equipment to be used, a schedule for the implementation of equipment during the development stage, explanation of the entry and crosscut spacing and of the resultant recovery rates both with and without secondary recovery of coal left in pillars. At another point, the plan indicates that longwall mining appears to be technically feasible The plan then discusses implementation of longwall techniques, lists the equipment that would be required, andindicates that recovery rates will range up to 89 percent as compared to the 67 percent obtainable with room and pillar mining if the coal in pillars is recovered. ARCO has not yet decided whether it will longwall due to relative considerations as capital requirements and productivity for longwall vs. room and pillar capital, productiviy, and mine size requirements.

CO-21

Another area of concern in the proposed mining plan is the number of seams to be recovered. The plan primarily addresses the recovery of coal in the F seam. There is also a brief discussion of why it is not economically feasible to recover 3.9 million tons of reserves in a relatively thin rider seam which overlies the F seam. However, there is little or no discussion of the recovery of coal from the underlying E. D. C, B and A seams. Based upon what is known about these seams from other mining operations in close proximity to the Mt. Gunnison property, the coal is of equal quality to that in the F seam and the total reserves contained in these other seams could be two to three times that contained in the F seam. Although, the recoverable reserves in the C seam would have been somewhat diminished by the mining activities of the Bear Mining Company in their ongoing, but limited, room and pillar operation in that seam.

There do not appear to be any geotechnical or environmental factors which would prevent or significantly interfere with a multi-seam mining operation at Mt. Gunnison. The C seam is being mined by the Bear Coal Company under an arrangement with ARCO. Multi-seam mining operations have been proposed at other underground mines in Colorado and are under consideration by ARCO. The large reserves in the F seam, however would probably delay any development of a multi-seam operation unless substantially all of the available capacity were under contract.

ARCO attributes its decision to mine the F seam first in part to engineering and safety considerations. According to ARCO, "Because of USGS regulations and sound mining engineering, accepted mining practice is to mine the upper seam first. Maximum resource recovery would be obtained in mining the seam from the top down and safety would not be compromised. "

Transportation of coal from the property does not appear to be a significant problem because access to the North Fork of the Gunnison spur of the Denver and Rio Grande Western Railroad could be obtained by construction of a 12,000 foot spur or an overland conveyor system. Construction of the necessary rail spur or conveyor will require resolution of highway location, landowner consent and topographic constraints for rights of way and loading facilities.

The two major questions to be answered are whether ARCO can find the markets for the several million tons of coal per year that it plans to produce and whether the coal can be economically mined and shipped to these markets at competitive rates. ARCO has indicated that its planned production levels are contingent on its ability to market the coal.

Diligent Development Analysis

The currently submitted mining plan for the Mt. Gunnison property provides for an initial 250,000 ton-per-year operation that would gradually be expanded to an annual production rate of 2.8 million tons over a 10-year period. This operation would continue to operate at that production level for an additional 17 years and after a total of 59 to 60 million tons of coal had been extracted or approximately 50 percent of the identified 118.7 million tons of in-place reserves, would shut down. There is no apparent reason other than market constraints, why the operation could not be operating by 1986 and thereby remain in compliance with the requirements for diligent development and continuous operation. if the Mt. Gunnison Mine is developed according to its mine plan schedule.

The project could easily satisfy the 1976 diligent development production requirements by 1986 according to its proposed plan of operations if it began development according to schedule and if the total reserves on which the diligence calculations are based include only the F seam reserves that ARCO contends are the only economically minable reserves on the tract. ARCO's position is that only the coal seams that it currently has determined are economic to mine should be considered as reserves when determining compliance with diligence rules. The USGS considers that other seams on the Mt. Gunnison tract are currently techically and economically feasible to mine. The seams below the F seam according to independent estimates could contain an additional 300,000,000 tons of in place reserves. If compliance with diligence regulations is measured by the total recoverable reserves on the tract and not the mine plan reserves,and if the total recoverable reserves are estimated at roughly 200,000,000 tons, ARCO would not produce enough to meet the diligence level of 2.5% of reserves by 1986. ARCO would be able to mine enough coal by 1991 to satisfy the higher diligent production level if it qualifies for an extension. The diligence problem could also be resolved if the USGS decided based on additional information submitted for mine plan approval that the other seams were not currently recoverable or if ARCO were allowed to relinquish seams that it does not intend to mine. Production of over 4 million tons from the Mt. Gunnison property by the 1986 diligence deadline would be difficult to do and ARCO does not yet have the customers to purchase the coal that would be mined.

STATE: COLORADO **REGION:** UINTA **COUNTY:** GUNNISON

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
MOUNT GUNNISON NO. 1	ATLANTIC RICHFIELD CO.	C0117192	12578	1243.49		U/G	SUBMITED	2.8 TPY
		C1362		4836.36				
		① D044569		1339.76				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 405.9 } all seams
RECOVERABLE: 202.95 }

Mine Plan reserves
In Place 118.7 } F seam only
Recoverable 60.0 }

SOURCE:
CENTRAL EIS/USGS
50% Recovery

All Figures Shown In Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS: ① BEAR MINE SUBLEASES 80-85 ACRES OF D044569 AND OPERATES THE C SEAM.

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: UINTA COUNTY: GUNNISON

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
MT. GUNNISON	ATLANTIC RICHFIELD CO	3	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	F	E	C	B				
FORMATION	MESA VERDE	MESAVERDE	MESA VERDE	MESA VERDE				
RANK	h V B/C b	bit	bit	bit				
THICKNESS	7.5' AVE		7.0' AVE	21.3' AVE				
Btu/LB	12,597	12,641	12705	12248				
SULFUR (%)	0.45	0.41	0.51	0.77				
ASH (%)	4.5	4.65	6.32	9.29				
MOISTURE (%)	7.52	6.82	5.68	5.77				
FIXED CARBON (%)	49.41	50.78	48.8	46.59				
VOLATILE (%)	38.57	37.75	39.20	38.35				
SEAM DEPTH	0-1080	0-1260	0-1460	0-1500				
IN-PLACE RESERVES ②	13.879	20.623	9.927	39.953				
RECOVERABLE RESERVES								
RECOVERY RATE	35-40	35-40	35-40	35-40				

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL			405.9	USGS/CENTRAL EIS
	SURFACE				
	UNDERGROUND	92.95	25.75	118.7 FSEAM	MINE PLAN
RECOVERABLE:	TOTAL			202.95	
	SURFACE				
	UNDERGROUND			60.0 FSeam	Mine Plan

NOTES: ② Seam by seam reserves reported on only 1 lease

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** UINTA **COUNTY:** GUNNISON

MINE NAME OR LEASE BLOCK: MT. GUNNISON
LESSEE(S): ATLANTIC RICHFIELD CO.
NUMBER OF LEASES: 3
DATE MINE OPENED: 1983
PROJECTED CLOSING DATE: 2011
REMAINING MINE LIFE: 28

REMAINING RECOVERABLE RESERVES:
FEDERAL:
NON-FEDERAL:
MINE DESIGN CAPACITY 2.8 TPY
RECOVERY RATE: 50% overall
CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION ②	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981	0.1	.250 ①	NONE
1982	0.3		
1983	0.5		
1984	1.1		
1985	1.3		
1986	1.4		
1987	1.8		
1988	2.4		
1989	2.6		
1990	2.8		
Post 1990	2.8		

NOTES: ① PRODUCTION IS TO START 1981, HOWEVER IT IS TO INCREASE TO 2.8 TPY OVER A TEN YEAR PERIOD AND DATA WAS NOT SUPPLIED TO SHOW THE INCREMENTS BY YEAR. PRODUCTION TO START IN "F" SEAM.

② F seam production only from ARCO mine plan.

All Figures Shown in Million Tons

PRODUCTION SUMMARY

COAL BASIN MINES
(DUTCH CREEK NO. 1 AND NO. 2, L.S. WOOD NO. 3,
BEAR CREEK MINE NO. 4 AND COAL BASIN NO. 5
MID CONTINENT RESOURCES INC.
MAP LOCATION C - 18

FEDERAL LEASES:	C0115606	(80 Acres)
	C011646	(956.6 Acres)
	C0125456	(80.0 Acres)
	C030345	(117.04 Acres)
	C12640	(40.0 Acres)
	C074632	(680.0 Acres)
	C0125457	(1142.31 Acres)
	C09004	(1529.19 Acres)
	C09005	(1365.40 Acres)

PITKIN COUNTY, COLORADO
GUNNISON COUNTY, COLORADO

Mid-Continent Resources Inc. is presently operating five separate underground coal mines in the Coal Basin seam (4 mines) and Dutch Creek seam (1 mine). Current production level is 850,000 tons per year. No coal is produced utilizing surface mining techniques, nor are surface operations other than those incidental to regular mining contemplated or planned. The mines (Dutch Creek Nos. 1 and 2, L. S. Wood No. 3, Bear Creek Mine No. 4 and Coal Basin No. 5) are located approximately 6 miles west of Redstone, Colorado in Pitkin and Gunnison Counties. The mines are located on approximately 5,760 acres of fee land and 5,420 acres of Federally leased land (White River and Gunnison National Forests).

The tracts comprising the Coal Basin Mines properties are described below:

Property Description	Acres
Federal Coal Lease C0115606 comprised of tracts in secs. 24 and 25, T. 10 S., R. 90 W., Sixth Principal Meridian	80.00

5A, #2

Property Description (cont'd)	Acres
Federal Coal Lease C011646 comprised of tracts in secs. 28-30, T. 10 S., R 89 W., Sixth Principal Meridian	956.60
Federal Coal Lease C0125456 comprised of tracts in sec. 24, T. 10 S., R. 90 W., Sixth Principal Meridian	80.00
Federal Coal Lease C030345 comprised of tracts in sec. 25, T. 10 S., R.90 W., Sixth Principal Meridian	117.05
Federal Coal Lease C12640 comprised of tracts in sec. 25, T. 10 S., R. 90 W., Sixth Pricipal Meridian	40.00
Federal Coal Lease C074632 comprised of tracts in secs. 31, 34 - 35, T. 10 S., R. 89 W., Sixth Principal Meridian	680.00
Federal Coal Lease C0125457 comprised of tracts in secs. 17 and 19-21, T.10 S., R.89 W., Sixth Principal Meridian and sec. 24, T.10 S., R.90 W., Sixth Principal Meridian	1142.31
Federal Coal Lease C09004 comprised of tracts in secs. 6, 7, 18 - 19, T.10 S., R. 89 W., Sixth Pricipal Meridian, and secs. 13 and 24, T.10 S., R.90 W., Sixth Pricipal Meridian	1529.19
Federal Coal Lease C09005 comprised of tracts in secs. 8, 16, 17, 21, and 23, T.10 S., R.89 W., Sixth Principal Meridian	1365.40

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Two known mineable coal seams exist within boundaries of the amended LMU and are located stratigraphically about 450 feet apart. Four of the existing mines are located adjacent to each other in the lower Coal Basin "B" seam. A single mine, the Dutch Creek No. 2 Mine is located in what is known locally as the Dutch Creek or "Middle Bed". One additional coal seam, the Placita seam lies 130 to 225 feet above the Dutch Creek seam; it is highly variable in thickness and remains unmined.

Coal in Coal Basin ranks as mid-volatile bituminous. All of the coal is used in making metallurgical coke. The average coal analysis of the Dutch Creek Mines is as follows:

Moisture	6.96%
Volatile matter	24.66%
Fixed carbon	68.62%
Ash	6.72%
Sulfur	0.61% .

Estimates of total in-place reserves on the respective Federal leases are assessed according to type: Type I - Reasonably Assured Recoverable, and Type II - Potentially Recoverable, and Type III - Possibly Recoverable.

Lease No.	Type I	Type II	Type III
C09005	0 tons	0 tons	0 tons
C0125456	629,000	599,000	465,000
C0125457	6,210,000	1,189,000	3,088,000
C0115606	918,000	322,000	479,000
C12640	418,000	157,000	212,000
C030345	1,385,000	371,000	530,000
C011646	4,152,000	568,000	1,566,000
C09004	3,116,000	4,672,000	1,818,000
TOTAL	16,891,000	7,878,000	8,158,000

GRAND TOTAL 32,927,000

202

The current production rate of approximately 850,000 tons/year is accomplished by room and pillar and an advancing longwall system. In March, 1980, the State of Colorado approved a major modification to the Mining and Reclamation Plan for the Coal Basin Mines. The modification involves construction of a permanent fill and two 14,000-foot long tunnels to connect 5 underground mines (Dutch Creek Nos. 1 and 2, L.S. Wood No. 3, Bear Creek Mine No. 4 and Coal Basin No. 5).

Production Capability Analysis

The Coal Basin complex of mines operated by Mid-Continent Resources contain coal seams that are among the highest quality and the thickest of those to be found anywhere. The economic advantage of the high quality is evidenced by the fact that all of the production is sold on the premium-priced metallurgical coal market. It has been somewhat more difficult to gain full economic advantage from the thickness of the coals.

Depths of cover from 2000 to 2500 feet clearly rule out the surface mining of the 5 to 35-foot thick Dutch Creek and Coal Basin seams. Currently, practiced underground mining techniques in the United States can readily deal with minable thicknesses of the 10 or 12 feet. In limited cases this upwarded limit has been extended to 15 or 16 feet. Mid Continent has clearly shown itself to be receptive to new approaches to underground coal mining. When the Dutch Creek No. 2 Mine went into production in 1974 it was the first mine in the United States to ever use the advancing longwall method.

The success of its first longwall operation led the company to install a second advancing longwall, this one in its L. S. Wood No. 3 Mine. This year the company signed a cooperative agreement with the Department of Energy to develop multilift longwall operations in its L. S. Wood Mine. The concept here, one that is already in use in Europe, is for sequenced multiple extraction of coal from the seam by more than one longwall. In this particular case the first longwall will take an 8-foot cut from the top of

A second longwall will follow with an 8-foot cut from the bottom of the seam. A 4-foot section will be left between the cuts to form a roof for the lower longwall operation. It is projected that the multi-lift longwall approach will push the overall recovery rate to as high as 60 percent. This would be a very significant accomplishment considering the currently estimated overall recovery rate for all of the mines in the Coal Basin LMU is a little over 20 percent.

Mid Continent is currently constructing two rock tunnels to connect the five mines. The tunnels will be parallel and will have total lengths of over 14,000 feet and when completed will make it possible to move men and materials to the mines and bring coal out of the mines underground and not over surface roads as has been the practice in the past. This eliminates much of the need to deal with winter maintenance of haul roads in a plus 8,000 foot mountain environment. Another big advantage is that it minimizes the impact of the mine complex on its environment.

The environmental impact of the complex has been minimal. It has been necessary to place rock from the construction of the tunnels in a pile adjacent to the portals. The company has leveled and compacted the top of the pile to provide an enlarged working area at the mine mouth. Permits have been granted by the federal government for the company to leave the material in this location permanently.

Coal is transported by truck from a preparation located at the portal area to a rail loadout facility for the Denver & Rio Grande Western Railroad. This is a significant amount of coal to truck but there is no ready option.

Diligent Development Analysis

Based on the current annual production rate of 850,000 tons and identified recoverable reserves of approximately 32 million tons, the reserves will be depleted in approximately 38 years. Hence, the company is currently meeting the diligent development and continuous operation requirements. However, if the company is successful in improving the recovery rates in some or all of its mines, then the estimated recoverable reserves will increase accordingly. The company should, therefore, be considering the expansion of the total production capability of the Coal Basin complex.

STATE: COLORADO **REGION** UINTA **COUNTY:** GUNNISON & PITKIN

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
COAL BASIN	MID-CONTINENT RESOURCES, INC.	C0115606	11,180	80.0	5,760	U/G	Approved	1.3 TPY
		C011646		956.6				
		C0125456		80.0				
		C030345		117.05				
		C12640		40.0				
		C074632		680.0				
	PITKIN COUNTY	C0125457		1142.31				
		C09004		1529.19				
		C09005		1365.40				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 154.287

RECOVERABLE: 65.854

SOURCE: USGS

ASSOCIATED LEASES WITH REASONS WHY:

All Figures Shown in Million Tons

COMMENTS: 5 OPERATING MINES IN MINE PLAN ARE TO BE CONNECTED BY TWO 14,000 FT. TUNNELS ONE FOR EQUIPMENT & MEN, THE OTHER FOR COAL TRANSPORT, TUNNEL EXPECTED TO EXTEND MINE LIFE. MINES ARE: DUTCH CREEK NO. 2 OPERATING ON THE DUTCH CREEK SEAM

DUTCH CREEK NO. 1
L. S. WOOD #3
BEAR CREEK #4
COAL BASIN #5
} ALL OPERATE ON THE "B" SEAM

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: UINTA COUNTY: GUNNISON & PITKIN

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
COAL BASIN	MID-CONTINENT RESOURCES	9	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2 ①	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	DUTCH CREEK	"B"						
FORMATION								
RANK	MID V b	MID V b						
THICKNESS								
Btu/LB *	14,500							
SULFUR (%)	0.61							
ASH (%)	6.72							
MOISTURE (%)	6.96							
FIXED CARBON (%)	68.62							
VOLATILE (%)	24.66							
SEAM DEPTH	2000'	2450'						
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE	33	25						

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			154.287	USGS
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			65.854	USGS

NOTES: * ANALYSIS IS AN AVERAGE

① "B" SEAM IS A BENCH OF THE COAL BASIN SEAM, COAL BASIN SEAM IS 20-35' THICK

ALL COAL IS HIGH GRADE COKING COAL

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** UINTA **COUNTY:** GUNNISON & PITKIN

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	DATE MINE OPENED: 1976 PROJECTED CLOSING DATE: 2000 REMAINING MINE LIFE: 20
COAL BASIN	MID. CONTINENT RESOURCES	9	

REMAINING RECOVERABLE RESERVES:
FEDERAL: 65.854
NON-FEDERAL:

MINE DESIGN CAPACITY 1.3 TPY
RECOVERY RATE: DUTCH CREEK 33 / "B" 25

CUMULATIVE PRODUCTION TO 1979: 11.003
1979 ACTUAL PRODUCTION: 0.078 ACLDS

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	0.85	0.85	
1981	1.1	0.85	TO U.S. STEEL AND CF&I
1982			
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990	1.1	0.85	
Post 1990	11.0	8.5	

NOTES: LOW RECOVERY DUE TO A VARIETY OF COMPLEXITIES CAUSED BY FAULTS, IGNEOUS INTRUSIVES, ROOF CONTROL AND METHANE.

JAN., 1980 ANNOUCEMENT THAT LONG WALL MINING IS TO BE USED IN THE L.S. WOOD #3 MINE TO RECOVER A THICK SEAM BY TWO PASSES. RECOVERY SHOULD BE 60%

All Figures Shown in Million Tons

PRODUCTION SUMMARY

HAWK'S NEST EAST AND HAWK'S NEST WEST MINES
WESTERN SLOPE CARBON, INC.
MAP LOCATION C- 19
FEDERAL COAL LEASES: C17130
D056724
D042921
C27103
GUNNISON COUNTY, COLORADO

The Hawk's Nest mines, owned by Western Slope Carbon, Inc. a subsidiary of Northwest Energy Company (part of Northwest Pipeline Corporation), are located in the eastern part of the Somerset coal field in western Gunnison County, Colorado. The mines are located along the north side of the North Fork Valley of the Gunnison River approximately one and a half miles east of the community of Somerset and thirteen miles northeast of Paonia, Colorado. The Hawk's Nest No. 1 mine, the oldest, is closed. The Hawk's Nest East mine (formerly the No. 2) is currently operating, and the Hawk's Nest West mine (formerly the Hawk's Nest No. 3) is being developed further.

Tracts comprising the Hawk's Nest property include:

Property Description	Acres
Federal Coal Lease C17130 comprised of tracts in secs. 2 and 3, T. 13 S., R. 90 W., Sixth Principal Meridian (Coal seams "A", "B", and "C" subleased to United States Steel Corporation	241.10
Federal Coal Lease D056724 comprised of tracts in secs. 10 and 11, T. 13 S., R. 90 W., Sixth Principal Meridian (Coal seams "A", "B", and "C" subleased to United States Steel Corporation)	189.24

Property Description	Acres
Federal Coal Lease D042921 comprised of tracts in secs. 1, 2, 11, and 12, T.13 S., R. 90 W., Sixth Principal Meridian (Subleased to Western Slope Carbon, Inc. by Champion Coal Mining Company)	818.53
Federal Coal Lease C27103 comprised of tracts in secs. 1 and 12, T.13 S., R. 90 W., Sixth Principal Meridian	289.74
Land leased from United States Steel Corporation and Fee land owned by Western Slope Carbon, Inc.	Acreage not available
Total Acreage	1,538.61+

Coal in the Somerset coal field occurs in two members of the Upper Cretaceous-age Mesaverde Group, the lower Bowie Shale member and the upper Paonia Shale member. Six major mineable coal seams occur within the Hawk's Nest Property and are, in sequence, from bottom to top:

Bowie Shale member coals

The "A" coal seam, approximately four feet thick, lies nine feet above the Rollins Sandstone.

The "B" coal seam is ten feet above the "A" seam and is the thickest of the seams, often exceeding 20 feet thick. Locally the "B" seam may be split by a few feet of rock into the "B" and "B " seams.

The "C" coal seam is separated from the "B" seam by 45 to 49 feet of rock and ranges in thickness from 7 to 9 feet.

Paonia Shale member coals

The "D" or Oliver coal seam lies 185 feet above the "C" seam and is lenticular, ranging from 1 to 19 feet in thickness.

The Wild coal seam is found 40 feet above the "D" seam and is a lenticular, inconsistent seam ranging from 1.5 to 5.7 feet in thickness.

The "E" or Hawk's Nest coal seam lies approximately 84 feet above the Wild seam and ranges in thickenss from 6 to 9 feet where it is mined on the Hawk's Nest property. Its thickness varies and rolls are frequently encountered. The coal seam dips about 4 to the north. The "E" seam coal is relatively strong, exceptionally clean and of coking quality.

The floor underlying the "E" seam is made up of approximately four feet of fire clay (soft shale). The roof is often very weak and may be extrememly difficult to support. The full coal seam (7 to 9 feet) is mined and a few feet of top coal is left only when necessary as the only practical means of roof control. The roof varies from laminated shale to massive sandstone across the mine. In some areas 12 to 14 feet of highly fractured unconsolidated rock lies between the "E" seam and a rider seam which makes a competent roof structure.

Coal produced from the "E" seam of the Hawk's Nest mines is classified as high-volatile B bituminous with coking characteristics. Average proximate analysis on an as-received basis are as follows:

Moisture	6.60%
Volatile matter	39.69%
Fixed Carbon	50.12%
Ash	6.59%
Sulfur	0.65%
Btu/lb	12,600

Estimated recoverable reserves in the "E" seam were 5,609,000 tons as of September 1976 (Western Slope Carbon, Inc., mine plan supplement). An estimated 29,400,000 tons was reported by Western Slope Carbon, Inc. as maximum recoverable in the lower coal seams. Production was estimated (in the same mine plan) to be 250,000 tons of coal in 1977, 500,000 tons per year in 1978 and 1979, and 1,000,000 tons per year in 1980 through 1982.

Room and pillar extraction using continuous miners are now or will be employed in both of the Hawk's Nest mines. Entries have been developed to all boundaries of the Hawk's Nest East mine and panels are being developed and mined. Coal is loaded into shuttle cars at the face and transferred to a conveyor belt to the surface. Continuous miners cut a 16-x 20-foot area which is immediately rock bolted on four-foot centers. Because of poor roof conditions in part of the mine and continual rock stress, panels are driven with as few entries as possible and only for short distances.

Western Slope Carbon, Inc. is planning the installation of a 410-foot solid coal face longwall mining unit in the western part of the Hawk's Nest East mine where roof conditions make continuous miner development and room and pillar extraction difficult. Much of the western area of the mine is under 2,000 feet or more of cover. Development and extraction of longwall panels will continue toward the north to allow for better recovery in the event coal to the north of the Hawk's Nest mines Property becomes available for lease. A 500-foot barrier will be maintained between the longwall panels and the Main Slope entries because of the difficulty anticipated in keeping the entries open.

The Hawk's Nest West mine is being rehabilitated and entries are being developed to mine additional leased coal reserves using both continuous miners and longwall equipment. Production is scheduled to begin in 1981.

A coal washing plant and unit train loading facilities have been recently completed near the Hawk's Nest East and Hawk's Nest West mine, respectively. The North Fork Spur of the Denver and Rio Grande Western Railroad along the North Fork Valley provides unit-train transportation for the Hawk's Nest mine.

Western Slope Carbon, Inc. has proposed driving three declines from the "E" coal seams level to the lower Wild and "D" coal seams. The declines would drop 150 feet vertically in approximately 790 feet of decline (15 percent).

Production Capability Analysis

Western Slope Carbon considers there to be two distinct mines on the four federal coal leases and the associated fee land they now control. In reality there is only a single LMU. Active mining is taking place in the southeast portions of the LMU in what is known as the Hawk's Nest East Mine. Mining activity will return to the western portion of the LMU when a longwall operation is begun in 1981 or 1982.

The present continuous miner operation appears to be operating satisfactorily. The company reports the use of five continuous miner headings with coal production ranging from 600 to 700 tons per day for a two-shift operation. Assuming a 240-day operating year, the annual coal production would then range from 720,000 to 840,000 tons. A single figure estimate of 800,000 tons would seem reasonable.

At various times, the company has given production estimates of 1.0, 1.2 and 1.4 million tons per year for the Hawk's Nest East Mine once the longwall operation has begun.

Similarly, the company projects a combined product rate of 2.5 million tons per year from the East and West Mines when a second longwall operation is initiated in the West Mine[1/] Considering the fact that the company has no experience in longwall mining and that there is only a little more than 4 million tons remaining in the currently mined "E" seam, it would seem that

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[1/] Coal Age, June 1980, p. 62

these production estimates are quite optimistic. A more reasonable estimate would assume that the continuous miner production would remain at its current level of 800,000 tons during 1981 and that and additional 200,000 tons would be produced from the longwall operation. Once the miners and the foremen become experienced in longwall operations, production from a single wall could expand to 400,000 or 500,000 tons per year.

Mining conditions on the currently mined "E" level seem relatively good. There are some roof support and water problems but these are being dealt with satisfactorily. Relocation of operations to the next lower Wild seam could present a number of problems. Present plans for accomplishing this provide for the construction of a nearly 800-foot long underground slope to connect the "E" and Wile levels. This slope will add a considerable distance to the route which men and materials must travel to get to the working faces. This will have a significant impact on the cost of extracting coal from the Wild seam.

Mining costs for coal from the lower level will be further increased because of the reduction in the seam thickness. Current operations are in 7 to 9-foot coal, whereas, the Wild seam is estimated to be less than 6-feet thick.

Mining conditions will continue to worsen, and concomitantly costs increase, as mining progresses into the still lower "D", "C", "B" and "A" seams. Haulage distances will grow as slopes are driven from the Wild to the "D" level and from the "D" to the "C" level.

And finally, with the sinking of shafts to service the "B" and "A" levels. All this would indicate that the current estimate of 29,400,000 million tons of recoverable in the lower seams is highly questionable. One approach would be to discount this number by as much as 50 percent until more is known about these seams and Western Slope Carbon has formally submitted a mining plan that clearly describes how their coal is going to be recovered. This approach can be justified by the fact that the two best remaining seams, the "C" and the "B", have estimated thcknesses of 7 to 9 feet and 20 feet, respectively. Seams of this thickness and of the quality that is typical of the seams in this field, could definitely be mined economically with a well designed shaft operation.

The most significant environmental problem at this time is the disposal of the washing plant reject material. The present solution is to truck this material to a local landfill. The solution now being considered for adoption is to transport this material back into the mine and dispose of it in mined out areas. This solution seems acceptable as long as it is done with a view towards future mining operations in the lower seams. There have been cases where potentially unstable waste material such as this has broken through and flooded lower workings with a subsequent loss of life.

Transportation of the mined coal to market is well provided for. There is a unit train loadout facility located at the mine site. Trains move over a spur of the Denver & Rio Grande Western Railroad for a distance of 95 miles to connect with the east-west main line.

Diligent Development Analysis

Based on Western Slope Carbon estimates, there is approximately 35 million tons of recoverable reserves remaining on the LMU. If the company does achieve a production rate of 1 million tons in 1980 and continue to increase that rate in future years, then it will be well within the diligence and continuous operations requirements. However, if the company does have difficulty in relocating mining operations to lower levels, then there could be reason for concern. This determination can be better made when the company submits its mine plan for the lower seams.

STATE: COLORADO **REGION:** UINTA **COUNTY:** GUNNISON

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
HAWK'S NEST EAST	WESTERN	C 17130		241.1			APPROVED	1.25 TPY
HAWK'S NEST WEST	SLOPE	D056724		189.24		U/G	1-16-78	LIMITED BY WASH
	CARBON,	D042921		818.53				PLANT CAPACITY
	INC.	C 27103		289.74				
								1.4 POSSIBLE

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 70.0

RECOVERABLE: 35.0

SOURCE: IC.

All Figures Shown In Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS: PLANS ARE TO START LONGWALL MINING IN 1981 - PRODUCTION ESTIMATE 1.415 TPY

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: UINTA COUNTY: GUNNISON

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
HAWK'S NEST EAST & WEST	WESTERN SLOPE CARBON, INC.	4	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	"E"	WILD	"D"	"C"	"B"	"A"		
FORMATION	MESA VERDE							
RANK	hv Bb							
THICKNESS	7'-9'	2'-6'	1-14'	7-9	UP TO 20'	4'		
Btu/LB	12,600							
SULFUR (%)	0.65							
ASH (%)	6.59							
MOISTURE (%)	6.6							
FIXED CARBON (%)	50.12							
VOLATILE (%)	39.69							
SEAM DEPTH	MAX 2400'							
IN-PLACE RESERVES								
RECOVERABLE RESERVES ①	4.3596							
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			70.0	IC
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			36.0	IC

NOTES: COKING COAL, QUALITY - MAXIMUM RECOVERABLE COAL FOR LOWER SEAMS THAN THE "E" SEAM = 29.4 TONS AS REPORTED BY WSC, INC.

① ESTIMATED REMAINING RECOVERABLE BASED UPON ESTIMATED PRODUCTION 1977 → 1979

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** UINTA **COUNTY:** GUNNISON

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	
HAWK'S NEST EAST & WEST	WESTERN SLOPE CARBON, INC	4	DATE MINE OPENED: 1976 PROJECTED CLOSING DATE: 2007 REMAINING MINE LIFE: 27

REMAINING RECOVERABLE RESERVES:
FEDERAL: 35.0 1C
NON-FEDERAL:

MINE DESIGN CAPACITY 1.25
RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	0.8	1.0	
1981	0.8	↓	0.121 TPY - CF&I STEEL
1982	1.0	5 yr MINE PLAN	0.100 TPY - CENTRAL ILLINOIS
1983	1.1		POWER & LIGHT
1984	1.2	1.0	
1985	1.2		
1986	1.25		
1987	1.3		
1988	1.3		
1989	1.3		
1990	1.3		
Post 1990	22.5		

NOTES: PRODUCTION IN FUTURE EXPECTED FROM WILD AND D SEAMS.

All Figures Shown In Million Tons

PRODUCTION SUMMARY

SNOWMASS MINE

(THOMPSON CREEK MINES)

SNOWMASS COAL COMPANY

MAP LOCATION C-25

FEDERAL COAL LEASES: C08172 (2,413.05 Acres)
C08173 (2,468.90)

PITKIN COUNTY, COLORADO

Snowmass Coal Company is operating the North Thompson Creek Mines, which are located approximately 10 miles southwest of Carbondale, Colorado. Access roads are State Highway 82 just west of Carbondale and southwest 10 miles on County Road 108 to the mine. Anschutz Coal Corporation is the current lessee for the Federal leases. The surface ownership is essentially controlled by two related corporations, The Anschutz Corporation and The North Thompson Four-Mile Mineral and Land Corporation. The coal rights belong to the above corporations and the Federal Government.

The lands leased by the Anschutz Coal Corporation lie in the Grand Hogback monocline; to be more specific, in the Uinta Region of the Glenwood Springs District on the south end of the Grand Hogback. The coal seams of interest are in the Bowie and the Paonia Members of the Mesaverde Formation of the Upper Cretaceous age. In the lowest Bowie unit, three seams exist, only two are of commercial thickness, the "A" and the "B." The Paonia group contains five beds; all are mostly thin seams. The Anderson seam has proven coking characteristics and a valuable seam thickness while the Sunshine seam has potential for development.

Generally, the coal beds in the area dip to the west at 30° to 35°, local variations occur as a result of minor folding and faulting. The upper beds are generally under 1,000 feet of overburden while the lower beds are under at least 2,000 feet of cover. All previous mining has been from slopes from the outcrops, extending a short distance down dip. Primarily, mining has been along the strike so the operation would not be under heavy cover.

All of the beds have high ash coal, bone, or shale bands in the areas sampled. Coal in the "A," "B" and Anderson beds was washed in the past and mixed to lower the ash content. That product was used for coking at the Geneva plant of U. S. Steel. Coal in the area is classified as high volatile bituminous according to A.S.T.M. Standards for coal and coke. Quality analysis, thickness and estimated reserves by seam for the North Thompson Creek area (Mine No. 2) are as follows:

	As-Received Basis		Dry Basis
	Anderson	"A"	"B"
Moisture %	1.97	2.5	0.0
Ash %	4.80	7.98	10.1
Sulfur %	0.64	0.73	1.0
Volatile %	33.55	29.57	28.0
Fixed carbon %	59.68	59.65	61.9
Heat value Btu/lb	14,334	13,970	14,000
Thickness feet	8-10	7-7.5	4.6-5.7
Reserves (tons in-place)	6,351,000	7,432,000	11,258,000
Reserves (recoverable)	4,456,000	5,200,000	7,881,000.

Total in-place reserves for the No. 1, No. 2 and No. 3 mine areas for all are indicated to be 149,545,000 tons and the recoverable is expected to be 85,035,000 tons.

The estimated reserves are from a Paul Weir Company study and reflect the reserve as of 1966 when production in the mine area had stopped. The recoverable figure is based upon the use of a longwall operation with a recovery factor of 70 percent.

Geologic hazards in the area are limited to one major fault that trends nearly east-west. The fault has a displacement of 600 feet and dies out in the west. Other faults in the area have a relatively minor displacement of a few inches to several feet. The faults affect the mining plan but do not create serious obstacles to the mining of coal.

The Anschutz Coal Corporation plans to use a longwall system of mining in the Thompson Creek Mines No. 1 and No. 2,respectively. The actual panels are to be 400 feet in width and 8,000 feet long on the strike and to be advanced along the strike of the coal seam. Both the No. 1 and No. 3 mines will be developed through the same procedure. Since the operation is operated on an approximate 30° slope, full or even partial explanation in this narrative cannot do the mining procedure justice; however, the analysis will reflect the actual mining plan exploration. Production from a single shift is expected to be 1,680 tons of coal with the face advancing approximately 7.5 feet. The limiting factor with the production is the capacity of the face conveyor with a rate of 700 tons per hours.

Coal haulage will occur through two methods, for the development coal or coal from strike entries and crosscuts, it will be loaded on a retractable conveyor in the lower entry, crosscuts, and upper entry of each set of entries and transferred into mine cars. The mine cars will dump the coal into a facility from which coal will be conveyed to the slope belt and moved out of the mine.

Tonnage from the mine will be based upon two types of production, the development and the longwall production. The following table is a summary of projected production based on a 70 percent recovery factor and an 85 percent recovery of the raw coal tonnage as clean coal.

Year	Tons Development	Tons Longwall Production	Total Tonnage
1	80,000	-0-	80,000
2	200,000	-0-	200,000
3	225,000	400,000	625,000
4	225,000	775,000	1,000,000
5-30	225,000	775,000	1,000,000
Total	6,500,000	21,325,000	27,905,000

Since the Thompson Creek mines closed in 1966, advances in new machine technologies have provided equipment which will permit full mechanization of mines having a pitch of 30°. Early in 1966, a longwall face was developed and tested in Thompson Creek No. 2 and was successful.

The technical equipment and expertise necessary for the extraction of coal at an angle of 30° is supplied by many manufacturers. They are used in a great number of European mines with evident success at pitches of 30° and more.

The mining of "A" and Anderson seams simultaneously is considered essential to achieve the most desirable coal for the metallurgical market. While "A" and Anderson differ in quality, both are strong coking coals, the blending of the coals is required.

The use of longwall mining techniques should give excellent recovery and safety features which will achieve the maximum recovery possible. Complete extraction of these two seams should make it feasible, if economics are right, to mine the reserves of the other seams where they are mineable. The mining of these seams should require very little additional environmental disturbance.

A reclamation schedule, including the estimated time-table for each phase of the work and for final completion of the work and for final completion of the program is listed below:

1. Backfilling and grading began in 1976 and continued into 1979 for the immediate requirements. In year 2038 when all reserves are exhausted, final work will be conducted.
2. Revegetation - same as above.
3. Refuse Disposal - continuous from 1977 through 2038.
4. Site Drainage, 1976, 1977, and finished in 1978.
5. Air quality - continuous
6. Wildlife Monitoring (continuous) & Improvement Project 1977-78.

27A, #4

7. Water quality - continuous for water quality monitoring. In 1978, a proposed mine discharge irrigation reservoir was to be planned.

Production Capability Analysis

The key to the development of a successful mining technique lies in finding a solution to the support problems and still being able to mine on a 30-degree dip. The modified longwall technique the company has proposed in its mining plan appears to satisfy both of these requirements. One of the advantages of longwall is that the controlled subsidence of the mined out areas removes pressure buildup on development workings. By orienting the longtudinal access of the longwall panel parallel to the strike, it is possible to take advantage of gravity to move the coal away from the face.

The improved recovery ratio, from 50 to 70 percent, and the reduced labor requirements are two additional advantages of using longwall. Once the company has had an opportunity to refine its modified longwall technique, it is expected that it will be able to meet the planned one million-ton-per-year production rate. Current plans are to mine out the 27.9 million tons of recoverable reserves over a 30-year mine life. This schedule provides for a reduced production rate in the first three years of operation.

Because all of the reserves will be recovered by underground mining, there will be a significantly reduced impact on the fragile alpine environment. Land disturbance will be limited to that required for the construction of mine support buildings and the location of access roads. Also, it will be necessary to dispose of coal refuse from the operation of the coal preparation plant. Current plans call for disposing of this material in a narrow valley near the mine surface facilities. This land will be reclaimed when mining operations have been shut down.

Coal from the preparation plant will be transported by truck to a rail loadout facility in Carbondale. There has been some concern as to the impact of the increased truck traffic on the narrow mountain raod. The company has agreed to help upgrade the road to help alleviate this problem.

Diligent Development Analysis

It appears that Snowmass Coal Company has both the financial resources and the markets to support the development of the Snowmass Mine. If the company is given approval to mine in the next two to three year period, it is projected that the mine will be in operation in 1986 and in compliance with the requirements for diligent development and continuous operation.

STATE: COLORADO **REGION:** UINTA **COUNTY:** PITKIN

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
SNOWMASS	ANSCHUTZ	C08172	4881.95	2413.05		U.G.	Submitted	1.0
	COAL CORP.	C08173		2468.9				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 42.517

SOURCE: IC

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS: ONE MAJOR E-W FAULT WITH A 600-foot DISPLACEMENT

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: UINTA COUNTY: PITKIN

MINE NAME (OR LEASE BLOCK): SNOWMASS

LESSEE(S) (OR OPERATOR): ANSCHUTZ COAL CORP

NUMBER OF LEASES IN BLOCK OR PLAN: 2

MINING METHOD: U.G.

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	ANDERSON	A	B					
FORMATION	Mesaverde	Mesaverde	Mesaverde					
RANK	hv b	hv b	hv b					
THICKNESS	8-10'	7-7.5'	4.6-5.7'					
Btu/LB	14,334	13,970	14,000					
SULFUR (%)	0.64	0.73	1.0					
ASH (%)	4.8	7.98	10.1					
MOISTURE (%)	1.97	2.5	0 x(1)					
FIXED CARBON (%)	59.68	59.65	61.9					
VOLATILE (%)	33.55	29.57	28.0					
SEAM DEPTH	1000'							
IN-PLACE RESERVES	6.351	7.432	11.258					
RECOVERABLE RESERVES	4.456	5.2	7.881					
RECOVERY RATE	70% (2)	70	70					

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			42.517	IC

NOTES: (1) DRY BASIS

(2) LONGWALL

COAL BEDS DIP 30° to 35° TO THE WEST

COKING COAL

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** UINTA **COUNTY:** PITKIN

MINE NAME OR LEASE BLOCK: SNOWMASS

LESSEE(S): ANSCHUTZ COAL CORP

NUMBER OF LEASES: 2

DATE MINE OPENED: 1987

PROJECTED CLOSING DATE: 2017

REMAINING MINE LIFE: ~30

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY 1.0

RECOVERY RATE: 70%

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			GENEVA PLANT OF U.S. STEEL
1981			
1982			
1983			
1984			
1985			
1986			
1987	0.080		
1988	0.200		
1989	0.625		
1990	1.000		
Post 1990	26.0		

NOTES: LONGWALL MINING ALONG STRIKE OF 30° - 35° DIP.

All Figures Shown In Million Tons

PRODUCTION SUMMARY

OHIO CREEK NO. 2 MINE
HENRY L. AND OPAL WEAVER
MAP LOCATION C- 20
FEDERAL COAL LEASE: C069942
GUNNISON COUNTY, COLORADO

Ohio Creek No. 2 mine owned and operated by Henry L. Weaver, is located about 15 miles NNE of Gunnison, Colorado. The mine site is located in the Ohio Creek Mining District which is in the southeast extremity of the Piceance Creek Basin, the Colorado portion of the greater Uinta Basin that straddles the Colorado-Utah state line.

Property Description	Acres
Federal Coal Lease C069942 in sec. 6 of T.15 S. R.86 W., Sixth Principal Meridian	80
Total Acres	80

The coal in Ohio Creek No. 2 area occurs in three beds: The middle bed or the "C" seam, the seam of economic importance, is 80 feet above the Rollins sandstone. The "C" bed is the only bed of mineable thickness and varies from four feet to five feet in thickness. The roof rock varies from soft shales to carbonaceous, laminated, loosely cemented, silty sandstone, and floor rock is shale. Coal beds in this region dip at about 3°NW from the Sawatch uplift into the deeper portion of the Piceance Creek Basin. Bony bands varying from one-half inch to 12 inches thick are found within the mineable coal seam and greatly affect the quality and saleability of the coal.

	Few thin bony bands	10-inch bony bands
Moisture %	9.7	10.2
Volatile Matter %	38.0	37.5
Fixed Carbon %	46.9	43.6
Ash %	5.4	8.7
Sulfur %	0.6	0.5
Btu/lb	11,840	11,080

This coal is classified as high volatile bituminous C and is non-coking in character.

According to the applicant, under a modification to the mine plan, the lease contains 23,520 tons of recoverable reserves. The USGS, in an effort to establish diligent development requirements, notified the applicant that the leasehold contains 290,000 tons of recoverable reserves.

Under the new mine plan, the electrically-powered hoist and mule will be replaced with an electrically powered locomotive. Under phase 1 of the plan, to commence in October, 1981, they plan to drive twin entries parallel to and east of the North and East boundaries of the current workings. The method of mining is by room and pillar and the new equipment purchased will allow a greater production rate. Coal is cut by conventional methods and transported to the new locomotive by a conveyor buggy having a six-ton capacity.

Production Capability Analysis

For most of its history the Ohio Creek No. 2 Mine has operated at a rate of a few thousand tons per year with most of the energy consumed by mining operations provided by men or mules. Because of events that took place in 1978 and 1979, including the issue of a cease and desist order by the State of Colorado and the reorganization of the federal lease to provide more minable tons, the mining equipment is being significantly upgraded and the annual production tonnage increased to 12,000 tons.

There is not indication that there has been any significant problems with ground support, water or gas during the operating history of the mine. Seam high is generally 5 to 5 1/2 feet with some areas as low as 4 feet. The lower seam height does make mining more difficult but still provides adequate room for the conventional mining method that is used.

The entry spacing has been at 50 feet and the spacing of the crosscuts at 40 feet. With the widths of the entries and the crosscuts at 20 and 25 feet, respectively, the nominal recovery rate is 45 percent. With the recovery of barrier pillars on retreat from a mined out area, the overall recovery rate has been increased to approximately 60 percent. Applying this latter figure to the in-place reserves, recoverable reserves of 290,000 tons are indicated.

One of the reasons for the cease and desist order by the State of Colorado in 1978 was the absence of a suitable mined waste rock disposal site. This is the result of the high, mountainous terrain that predominates in the vicinity of the mine that this problem has been fully resolved. One solution has been to dispose of some of this material in the mined out areas of the mine. It is not known whether or not all such material can be disposed of in this way.

Transportation of the coal from the mine will mostly likely continue to be by relatively small trucks. In the past, some consumers have come to the mine to haul coal away in pick-up trucks.

Diligent Development Analysis

Based upon an annual production rate of 12,000 tons and reconverable reserves of 290,000 tons, the remaining mine life is approximately 25 years. This life and production rate place the mine well within the requirements for diligent development and continuous operation.

STATE: Colorado REGION: Uinta COUNTY: Gunnison

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Ohio Creek No. 2	Henry L. Weaver Opal Weaver	C-069942	80	80		U/G	Approved	12,000*

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 290,000

SOURCE: USGS

*Small mine, actual figures

~~All Figures Shown in Million Tons~~

ASSOCIATED LEASES WITH REASONS WHY: Application for modification to Federal Lease, plan to increase M.P. by 120 acres and increase mine life.

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Colorado REGION: Uinta COUNTY: Gunnison

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
Ohio Creek No. 2	Henry Weaver	1	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	"C"							
FORMATION	Mesa Verde							
RANK	hvcb							
THICKNESS	4-7'							
Btu/LB	11890 ①							
SULFUR (%)	0.6							
ASH (%)	5.4							
MOISTURE (%)	9.7							
FIXED CARBON (%)	46.9							
VOLATILE (%)	38.0							
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES	290,000*							
RECOVERY RATE	60							

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND	290,000		290,000	USGS

NOTES: ① Analysis is with small bands of rock - OTA chose analysis w/ 12" bands of rock
Non-coking coal

*Actual figures
~~All Figures Shown in Million Tons~~

COAL RESERVES CHARACTERISTICS

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STATE: Colorado **REGION:** Uinta **COUNTY:** Gunnison

MINE NAME OR LEASE BLOCK: Ohio Creek No. 2

LESSEE(S): Henry L. Weaver

NUMBER OF LEASES: 1

DATE MINE OPENED: 1976

PROJECTED CLOSING DATE: 2004 POSSIBLE

REMAINING MINE LIFE: 24 (2)

REMAINING RECOVERABLE RESERVES:

FEDERAL: 290,000 *

NON-FEDERAL:

MINE DESIGN CAPACITY: 12,000

RECOVERY RATE: 60

CUMULATIVE PRODUCTION TO 1979: 220,000 ACLDS

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	12,000		
1981	12,000		Hauled to local market
1982	12,000		by truck
1983	12,000		
1984	(12,000)	POSSIBLE	
1985	(12,000)	"	
1986	(12,000)	"	
1987	(12,000)	"	
1988	(12,000)	"	
1989	(12,000)	"	
1990	(12,000)	"	
Post 1990	158,000	"	

NOTES: Coal is cleaned by picking out rock by hand.

① If 120 acres are leased, mine life extends to 2025. The 120 acres contains 501,800 tons of recoverable coal.

(2) AT CURRENT PROD RATE AND RECOVERABLE COAL

* Actual figures

~~All Figures Shown in Million Tons~~

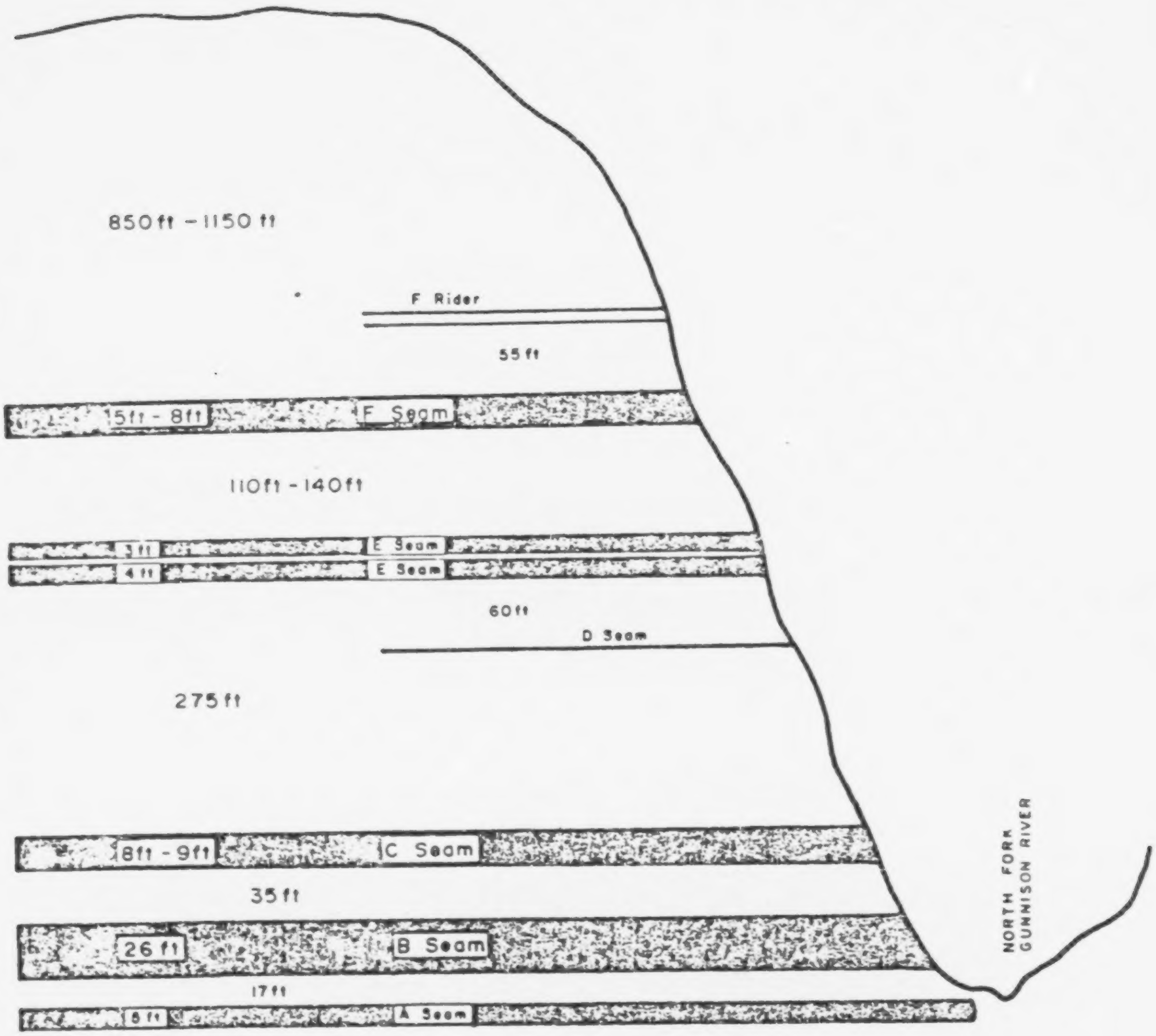
PRODUCTION SUMMARY

WINDJAMMER NO. 1 MINE
ANCHOR COAL COMPANY
MAP LOCATION C - 21
FEDERAL COAL LEASE: D052501 (280.0 Acres)
GUNNISON COUNTY, COLORADO

The proposed Windjammer No. 1 mine or the North Fork mine is located approximately 0.5 miles southeast of Somerset, Colorado. The mine plan includes a total of 297 acres, of which 280.0 are the Federal lease D052501 and 17.0 acres are fee land. All surface above the Federal lease is privately owned.

The coal beds in the permit area are in the Mesaverde Formation which is Upper Cretaceous age. The Mesaverde is approximately 2,500 feet thick in this area. It is overlain by the early Tertiary Ohio Creek conglomerate and underlain by the Mancos Shale, which is also Upper Cretaceous age. In the lease area the Mesa Verde information is composed of four members. In ascending order the members are, the Rollins Sandstone Member, the Bowie Shale Member, the Paonia Shale Member and a sequence informally named the barren member.

The Bowie Shale Member is composed of approximately 200 feet of intrabedded coal, sandstone and shale overlain by approximately 100 feet of sandstone containing thin beds and lenses of shale. The Bowie Shale Member contains, in ascending order, the A, B, and C coal seams. Above the Bowie Shale Member is the Paonia Shale Member which has a lithology similar to the Bowie Member. The basal portion consists of approximately 300 feet of interbedded coal, sandstone and shale. The sandstone-shale sequences appear to be lenticular in this member. Coal seams D, E, F and the F rider are contained in the Paonia member. In the mine permit area there are no significant structural features. The regional dip is about 3-1/2° NNE. Dips are locally higher within the coal seam, but most of these local, steeper dips are depositional.


850ft – 1150 ft
F Rider
55 ft
5ft - 8ft
F Seam
110ft - 140ft
3 ft
E Seam
4 ft
E Seam
60 ft
D Seam
275 ft
8ft - 9ft
C Seam
35 ft
26 ft
B Seam
17 ft
8 ft
A Seam
NORTH FORK
GUNNISON RIVER

Schematic of coal seams at the
proposed Windjammer Mine

ANCHOR COAL COMPANY

9/28/78

The uppermost seam, the F seam, will be the first of five seams within the leasehold area to be mined. It averages six feet in thickness. Approximately 50 percent recovery of the seam is estimated, but will vary depending on roof and floor conditions. The coal meets new source emission standards for sulfur, and has a calorific content of 12,000 Btu. Anchor Coal has not yet determined which, if any, of the other coal seams will be mined as part of its operations.

Reserve estimates are 2,200,000 tons in place in the F seam with about 1,100,000 tons recoverable. The life of the mine in the F seam will be 9.5 years at an assumed production rate of 120,000 tons per year. Possibly recoverable reserves for the other seams are not included in this production level.

Method of operating. The mine will be an underground mine with entry from the outcrop. The coal seam will be mined by room and pillar methods. The main set of five entries will proceed from the surface outcrop up dip in a southerly direction. Production panels will extend in a westerly direction through the bulk of the unit.

Entries for the production panels will be in sets of three. Barrier pillars will be left at the start of each panel. The room and pillar sections will be fitted into the development and production schedule for the most efficient operation in keeping with roof safety, ventilation requirements, and coal recovery.

Some room and pillar mining will proceed simultaneously with mining of the main entries, but the initial principle effort will be to drive the main entr through to the southern boundary of the lease area and begin production panel development.

Office, change house, shops, ventilation structures, conveyors, stockpiles, and loadout facilities for a 120,000 ton per year mine are planned. All the facilities will be located on fee surface.

It is expected that the full thickness of the coal seam will be mined. Construction will start as soon as all the permits are acquired. Production will begin about six months after construction. Design production will probably be attained within six months from initial production.

All of the area to be disturbed under this plan will be reclaimed to the present natural state. Mostly native vegetation will be reestablished on slopes returned as nearly as possible to the original contours with topsoil replaced as detailed below. Predominantly native vegetation was chosen over other alternatives because it best meets requirements of the projected post-mining land use.

Anchor Coal Company will replace overburden in the bench cut area and compact it for stability. Since all components of the produced coal will be sold and shipped as product, it is anticipated that no toxic materials will accumulate on site which would require special handling or disposal.

In order to control erosion on reclaimed areas, diversion ditches above the affected area will be maintained as part of the reclamation operation until the area is deemed successfully reclaimed by the regulatory authority. After successful reclamation, the diversion ditches will be removed. Grading of reclaimed areas will be done in a manner to control erosion and siltation from runoff crossing affected lands.

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Production Capability Analysis

The mining plan submitted by the Anchor Coal Company for the proposed Windjammer No. 1 Mine is based upon standard underground coal mine design concepts. The company proposes to mine five entries from the outcrop with all underground production extending from the initial five entries. The spacing of entries and crosscuts is planned for 80 feet with 20-foot wide openings. This translates into a theoretical recovery rate of 35 percent, without consideration of the coal left in the entry and barrier pillars, so it is assumed that the company is planning on secondary recovery of coal in pillars to achieve its planned overall recovery of 50 percent.

Depth of cover for the F seam is a rather nominal 850 to 1150 feet. Considering the indicated competency of the rocks which will form the roof and floor of the mined out areas, there is no reason to suspect that there will be any roof control problems. Because of the location of the seam to be mined relative to the surrounding topography, it is also unlikely that the presence of water will interfere with mining operations. In fact, there is a possibility that the lack of water may be more of a potential problem. At the present time, there is some doubt that the company will be able to obtain the rights for water to use for dust suppression and other similar requirements.

Because, the proposed operation is going to be underground, there are no significant surface environmental problems which are indicated. The major surface disturbance will result from the construction of a road from the valley floor to the portal located approximately 350 feet vertically up the mountain side. Because of the steepness of the terrain, the road will require use of a number of switchbacks.

A spur of the Denver & Rio Grande Western Railroad is located adjacent to the northern boundary of the proposed lease. It is assumed that the company will, therefore, be able to use this railroad to move its coal to whatever market are developed. The mine's planned production of 120,000 tons per year should not be sufficient to interfere with the current rights of other coal producers in the area to use the spur.

Diligent Development Analysis

The current mining plan addresses only the mining of the F seam on the proposed LMU. There are an additional 4 seams on the property (see the schematic cross-section that is included in this analysis) which have a potential for recovery. It is estimated that the in-place reserves for these 4 seams, given the existing property boundaries, are on the order of 18 to 20 million tons. These reserves might have the potential for extraction using the same entry-from-the-outcrop, continuous-miner operation planned for extraction of the topmost seam. However, assumption of the same production rate of 120,000 tons would translate into a mine life of 75 years.

The indicated quality of the reserves on the Windjammer property (12,500 to 13,000 BTU's per pound), the above average mining conditions for the F seam, and ther ready access to rail transportation would all indicate that there is a propability for the successful development of an economic mining operation. Because of the relatively limited initial investment required for the development of the mine there are no apparent factors, other than possibly markets, which would prevent development of of an operating mine by 1986, once mine plan approval is received. Based on the mine plan projected production rate, the company should be able to meet diligent development and continuous operation requirements. The mine plan does not indicate that the mine would qualify for a discretionary extension of the diligence deadline under the 1976 regulations (large mine size, contract deliveries after 1986, or commitment to synfuels production).

Additional Information supplied by Anchor Coal Company, Inc.

The mineability of other seams (in addition to the F seam) is not established according to the Anchor Coal Company. In their comments on the draft mine plan summary, the company supplied the following additional information on the coal resources on their lease.

A Seam - Limited interburden between the A and B seams, plus the location of the A seam below grade of the North Fork of the Gunnison River with the resultant water problems, classify the A seam as not mineable at the present time.

B Seam - Entry from the outcrop extraction, as proposed by Dames & Moore, is questionable for the B seam because of extensive underground workings of the abandoned Edwards Mine (mined prior to Lease acquisition by Anchor Coal Company). Additional investigation is required to ascertain the practicality of entry to remaining resources and the measurement of quantity of such resources. The mineability of the B seam would have to be classified as questionable at the present time. (It appears the Lease analysis report utilizes the full B seam thickness of approximately 20 feet throughout the Lease in calculating reserves and mine life. USGS restrictions limiting recoverable thickness to eight to ten feet, plus the extensive underground abandoned workings, will drastically reduce any potential resources of the B seam.)

C Seam - As in the case of the B seam, entry from the outcrop of the C seam will be deterred by the extensive abandoned underground workings of the Clark Mine. Additional investigation is required to ascertain the practicality of entry to the remaining resources and the measurement of quantity of such resources. The mineability of the C seam would have to be classified as questionable at this time. (It appears the Lease analysis report utilizes full seam thickness in the calculation of reserves without the necessary reduction of coal mined from the Clark Mine.)

E Seam - A parting of non-coal material of 1.1 to 2.5 feet thick separates an upper coal zone of approximately three feet and a lower coal zone of approximately four feet of coal. The parting makes questionable the mineability and merchantability of the E seam coal. The mining of the full seam, including parting, will result in a product with an excess of 27% ash and Btu of less than 9,900. Wash plant installation is prohibited by space and water limitations, refuse disposal problems, and higher product costs compared to non-washed coals produced locally. Specialized mining procedures to remove the parting during extraction of the coal result in drastically lower production, higher costs when compared to other locally produced coal, and a major problem of refuse disposal. (The Lease analysis report does not address the parting problems associated with the mining of the E seam and instead includes the entire E seam zone reserves as mineable.)

Anchor Coal is not alone in contesting the classification of other seams as mineable by the USGS and others. ARCO, Mt Gunnison Mine, and U.S. Steel, Somerset Mine, also have multiple seams on their lease tracts and propose to recover only certain seams. Whether the USGS will allow only partial recovery , which might be considered as coal "wastage" by some and a violation of the Mineral Leasing Act and regulations, or will reclassify the seams as non-recoverable or allow relinquishment of the unmined seams is not yet established.

Sources: Proposed Mining Plan for the Windjammer Mine submitted by Anchor Coal Company to the U.S. Office of Surface Mining, 1978; West-Central Colorado Environmental Statement, and comments by Anchor Coal Company, Inc. April 1981.

STATE: COLORADO **REGION:** UINTA **COUNTY:** GUNNISON

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
WIND JAMMER No.1	ANCHOR COAL CO	D052501	297	280.0	17.0	U/G	INCOMPLT M.P.	0.12

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 5.4

SOURCE: CENTRAL EIS

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: UINTA COUNTY: GUNNISON

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
WIND JAMMER	ANCHOR COAL CO	1	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	A	B	C	D	E	F		
FORMATION	MESAVERDE	→	→	→	→	→		
RANK								
THICKNESS						6'		
Btu/LB						12,000		
SULFUR (%)								
ASH (%)								
MOISTURE (%)								
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES						2.2		
RECOVERABLE RESERVES						1.1		
RECOVERY RATE						50		

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND	1.1 (F seam only)		5.4	CENTRAL EIS (all seams)

NOTES: PLAN TO START WITH THE F SEAM (upper most) MINE THE SEAM OUT 9.5 yrs @0.120 TPY

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** UINTA **COUNTY:** GUNNISON

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	DATE MINE OPENED: 1982-83
			PROJECTED CLOSING DATE: 1992
WINDJAMMER	ANCHOR COAL CO	1	REMAINING MINE LIFE: 9.5-10

REMAINING RECOVERABLE RESERVES:	MINE DESIGN CAPACITY 0.120	CUMULATIVE PRODUCTION TO 1979:
FEDERAL: 5.4		1979 ACTUAL PRODUCTION:
NON-FEDERAL:	RECOVERY RATE: 50	

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION ①	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983	0.120		
1984	↓		
1985			
1986			
1987			
1988			
1989			
1990	0.120		
Post 1990	0.300		

NOTES:

PRODUCTION TO PEAK AT 0.120 TPY

① F SEAM ONLY

All Figures Shown in Million Tons

PRODUCTION SUMMARY

CAMEO NO. 1 AND CAMEO NO. 2 MINES
GEX COLORADO, INC.
MAP LOCATION C - 22
FEDERAL COAL LEASE: C01538
MESA COUNTY, COLORADO

The Cameo No. 1 and No. 2 mines, owned and operated by GEX Colorado, Inc. (a subsidiary of General Exploration Company), are located in the eastern part of the Book Cliffs coal field (Palisade coal district) in Mesa County, Colorado. The Cameo properties lie west of the Colorado River in DeBeque Canyon adjacent to the Colorado Public Service Company Power plant at Cameo approximately 15 miles northeast of Grand Junction, Colorado. The main line of the Denver and Rio Grande Western Railroad and Interstate Highway 70 parallel the Colorado River a short distance from the mine.

The tracts comprising the Cameo properties are described below:

Property Description	Acres
Fee land in secs. 27, 28, and 34, T.10 S., R.98 W., Sixth Principal Meridian	965.72
Federal Coal Lease C01538 comprised of tracts in secs. 20, 21, 28, 29, 32, and 34, T. 10 S., R.98 W., Sixth Principal Meridian	2,560.00
Three DF&I Steel Corporation tracts comprised of deeded coal rights with surface easements in secs. 22, 23, 27, 33, and 34, T.10 S., R.98 W. Sixth Principal Meridian	1,289.00
Total Acreage	4,814.72

Additonal contigous Federal lands were nominated for lease in July, 1976 and include 2,560 acres in secs. 16, 17, 19, 20, 21, 22, 27, and 30, T.10 S., R.98 W.

21A, #2

Coal in the Book Cliffs coal field occurs in four coal zones in the Upper Cretaceous age Mount Garfield Formation of the Mesaverde Group. The most productive coal zone, the Cameo, is noted for its seam thickness and wide areal extent. It commonly contains one or two workable seams.

The Cameo properties lie on the southern rim of the Piceance Creek Basin where the strata dip gently (3°) to the north-northeast (N°30 E). There is no evidence of any major faulting in the immediate area of the Cameo mines.

The Cameo "B" and"C" seams are mineable under the Cameo properties; the "B" seam was the main source of past coal production. Separation between the seam varies from 0 to 30 feet. The Cameo "B" seam varies in thickness from 4 to 11 feet with the maximum thickness occurring down-dip at the northern extremity of the Cameo property. The Cameo "C" or rider seam is of mineable thickness in selected areas and could be mined where two seams coalesce.

Sandstone dikes which are extremely hard and several inches to several feet in length are characteristic of the Cameo coal zone and appear unpredictably throughout the property where they require drilling and blasting for removal. Their attitude is nearly vertical and their direction random.

The dikes may have resulted from plastic flowage of the underlying Rollins Sandstone into tension cracks in the coal. The dikes create occasional interruptions to the mining cycle, but can be handled with properly designed mining equipment.

Roof conditions are generally favorable with a roof of sandstone, shale or bony coal. The floor is sandstone. Overburden depths range from approximately 100 feet to 2,500 feet.

In the Palisade coal district, the coal produced from the Cameo seams is classified as high volatile B bituminous characterized by low-sulfur and moderately high ash content. Analyses show the coal exhibits a wide variance in ash and Btu content indicating a quality control problem in mining that requires washing to maintain consistent product quality. The weighted average as-received proximate analysis is derived from 63 analyses of unwashed mine-run Cameo seam coal is as follows:

Moisture	7.92%
Volatile matter	35.56%
Fixed carbon	46.94%
Ash	9.58%
Sulfur	0.64%
Btu/lb	11,773.

Current mine plans (as of March 1979) indicate that recoverable reserves in the Cameo properties (at a 65 percent recovery rate) are 31,992,000 tons with 22,878,000 tons in the Cameo No. 1 mine and 9,114,000 tons in the Cameo No. 2 mine. The estimated life of the Cameo properties is approximately 24 years (to March 2004). Peak annual production is estimated to be 1,488,000 tons per year. Approximately 26 percent of this raw coal will be rejected during washing.

Underground mining will be conducted using continuous mining equipment in room and pillar extraction. A seven-entry system will be extended through the property. After full development, various panels will be mined in sequence. Development of the Cameo No. 1 mine will be completed before development begins on the Cameo No. 2 mine. Coal extraction was scheduled to begin in early 1978 for the Cameo No. 1 mine and in July, 1974, for the Cameo No. 2 mine.

Coal is delivered by unit train to the Mississippi Power & Light Company plant in Jackson, Mississippi. Their contract calls for 13 million tons over a 16-year period.

Production Capability Analysis

Mining conditions in Cameo Mine No. 1 and the to-be-developed Cameo Mine No. 2 can be considered as ideal. The variation in seam thicknesses from 4 to 11 feet could cause some equipment scheduling problems over the lives of the mines but both of these extremes are well within the capabilities of currently available continuous mining equipment. The scheduling problems can be easily avoided if the owners continue to exercise the insightful mine planning techniques that characterize the Cameo operation to date.

The availability of competent sandstone formations to provide the floor and back in the mines is the most any operator could hope for. Ideal conditions such as this can provide a number of advantages. A competent back will minimize the hazards of roof falls and thereby provide lower cost operating conditions by allowing for reduced rock bolting requirements and greater mining widths. The thick, competent sandstone floor provides superior equipment maneuverability conditions and minimizes the possibility of bumping when the greater mining depths are reached.

The very respectable mining recovery rate of 65 percent also derives from the excellent mining conditions that exist on the Cameo properties. There is less concern with keeping the mined-out areas open until pillar recovery operations can be scheduled into an area. This also means that there will be less of a possible effect on the entries as long as adequate entry pillars are maintained.

With each mine having seven entries, there should be no problem achieving and maintaining the planned production levels. Cameo Mine No. 1 is projected to gradually grow to 1 million tons per year in 1986 and 1.2 million tons per year in 1989. The presently used mining method with continuous miners, shuttle cars, and conveyor haulage in the mains will support these rates easily as long as the conveyors are properly sized and an adequate number of continuous miners and shuttle cars kept in use. The same can be said for Cameo Mine No. 2 with its more modest projected ultimate production rate of 400,000 tons per year.

There should be no impact on the projected production rates from unacceptable environmental conditions. With the exception of the coal preparation and loading facilities and a limited number of surface buildings, the mines will be entirely contained underground. The mine plan indicates that adequate provision has been made for the disposal of coal preparation plant rejects and that the plant processing water is 100 percent retained.

The Cameo properties and their rail loadout facility are located adjacent to the mainline of the Denver & Rio Grand Western Railroad, so there should be no transportation problems in getting the coal to market.

Diligent Development Analysis

The Cameo properties LMU currently consists of 2560 acres of federally leased land and approximately 2250 acres of fee land. Identified recoverable reserves of 31,992,000 tons and a projected combined annual mining rate of 1,488,000 tons for the two properties means that the operator is well within the requirements of diligent development and continuous operation.

It is assumed that the additional federal acreage that was nominated for lease in 1976 would be used to expand the projected production rates are to extend the lives of the mines. The company's plans for this additional acreage would have to be evaluated when and if it becomes a reality.

STATE: CO REGION: UINTA COUNTY: MESA

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
CAMEO No. 1 & CAMEO No. 2 MINES	GEX COLORADO, INC.	C 01538	4,814.72	2,560.00	2,254.72	U/G	SUBMITTED M. P.	1.488 MTPY

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 31.992 M. TONS
CAMEO No. 1 22.878 M. TONS
CAMEO No 2 9.114 M. TONS
@ 65% RECOVERY RATE

SOURCE: LESSEE

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

DEC. 1976 RESERVES APPRAISAL INDICATES MEASURED RESERVES OF 41.739 M. TONS
RECOVERABLE RESERVES OF 29.217 M. TONS @ 70% RECOVERY RATE
INDICATED RESERVES OF 51.532 M. TONS

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Co
REGION: UINTA
COUNTY: MESA

MINE NAME (OR LEASE BLOCK): CAMEO No.1 & CAMEO No.2
LESSEE(S) (OR OPERATOR): GEX COLORADO, INC.
NUMBER OF LEASES IN BLOCK OR PLAN: 1
MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	"B"							
FORMATION	MT. GARFIELD							
RANK	hvBb							
THICKNESS	4-11 FT							
Btu/LB *	11,773							
SULFUR (%)	0.64							
ASH (%)	9.58							
MOISTURE (%)	7.92							
FIXED CARBON (%)	46.94							
VOLATILE (%)	35.56							
SEAM DEPTH	100-2500 FT.							
IN-PLACE RESERVES								
RECOVERABLE RESERVES	31.992 M TONS							
RECOVERY RATE	65%							

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL			31.992	LESSEE
	SURFACE			–	–
	UNDERGROUND			31.992	LESSEE

NOTES: * ANALYSIS WEIGHTED AVERAGE AS-RECEIVED PROXIMATE ANALYSES DERIVED FROM 63 ANALYSES OF UNWASHED MINE RUN CAMEO SEAM COAL SHIPPED FROM 1951 TO 1960.

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Co **REGION:** UINTA **COUNTY:** MESA

MINE NAME OR LEASE BLOCK: CAMEO No.1 & CAMEO No2

LESSEE(S): GEX COLORADO, INC.

NUMBER OF LEASES: 1

	CAMEO No.1	CAMEO No2
DATE MINE OPENED:	EARLY 1978	JULY 1994
PROJECTED CLOSING DATE:	SEPT. 2001	MARCH 2004
REMAINING MINE LIFE:	24 YEARS	

REMAINING RECOVERABLE RESERVES: 31,992 M. TONS

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY 1.488 M TONS

RECOVERY RATE: 65%

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION CAMEO No.1	TOTAL ANNUAL PRODUCTION CAMEO No.2	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	0.795			13 MILLION TONS OVER 16-YEAR
1981	0.795			PERIOD TO MISSISSIPPI POWER & LIGHT CO.
1982	0.846			IN JACKSON MISSISSIPPI
1983	0.900			
1984	.950			
1985	.975			
1986	1.00			
1987	1.05			
1988	1.10			
1989	1.20			
1990	1.30			
Post 1990	11.967	9.114		

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

COAL CANYON MINE
MID-CONTINENT COAL AND COKE COMPANY
MAP LOCATION C - 23

FEDERAL COAL LEASES:	C037277	(1,471.37 Acres)
	C059420	(308.21 Acres)
	D040389	(241.28 Acres)

MESA COUNTY, COLORADO

The Coal Canyon leases are located near the eastern end of the Book Cliffs, north of the Colorado River near the mouth of DeBeque Canyon, east-central Mesa County, Colorado. The properties are immediately northwest of the town of Palisade and southwest of the abandoned mining camp of Cameo, the latter now the site of Public Service Company of Colorado's Cameo Steam Plant. The city of Grand Junction is approximately 11 miles to the southwest. The properties are located near the southeastern end of the Book Cliffs coal field. Interstate 70 and the main line of the Denver & Rio Grande Western Railroad, north of the river, skirt the properties on the west.

The area is part of the eastern Colorado Plateau physiographic province. The principal drainage is Coal Creek, which nearly bisects the property. Coal Creek is an intermittent straam. All of the Coal Creek's tributaries located within the property boundaries are ephemeral streams.

The general structure of the coal field is of a north-northeasterly dipping monocline, or series of monoclines, depending upon the nature of local topography. Dips in the immediate vicinity of Palisade, just southeast of the Coal Canyon properties, range from 14° to 18° NNE, but decrease rapidly to the north, east and south. Dips on the properties range from 10° to 18° south of Coal Creek to as low as 3° to 4° in the northeast corner of Lease C037277.

Coals of commercial quality and quantity in the Book Cliffs coal field are restricted to the Upper Cretaceous Mancos Shale and Mesaverde Group.

Accordingly, that portion of the Mesaverde Group below the top of the Rollins Sandstone and above the base of the lowest sandstone in the upper Mancos is here designated the Iles Formation.

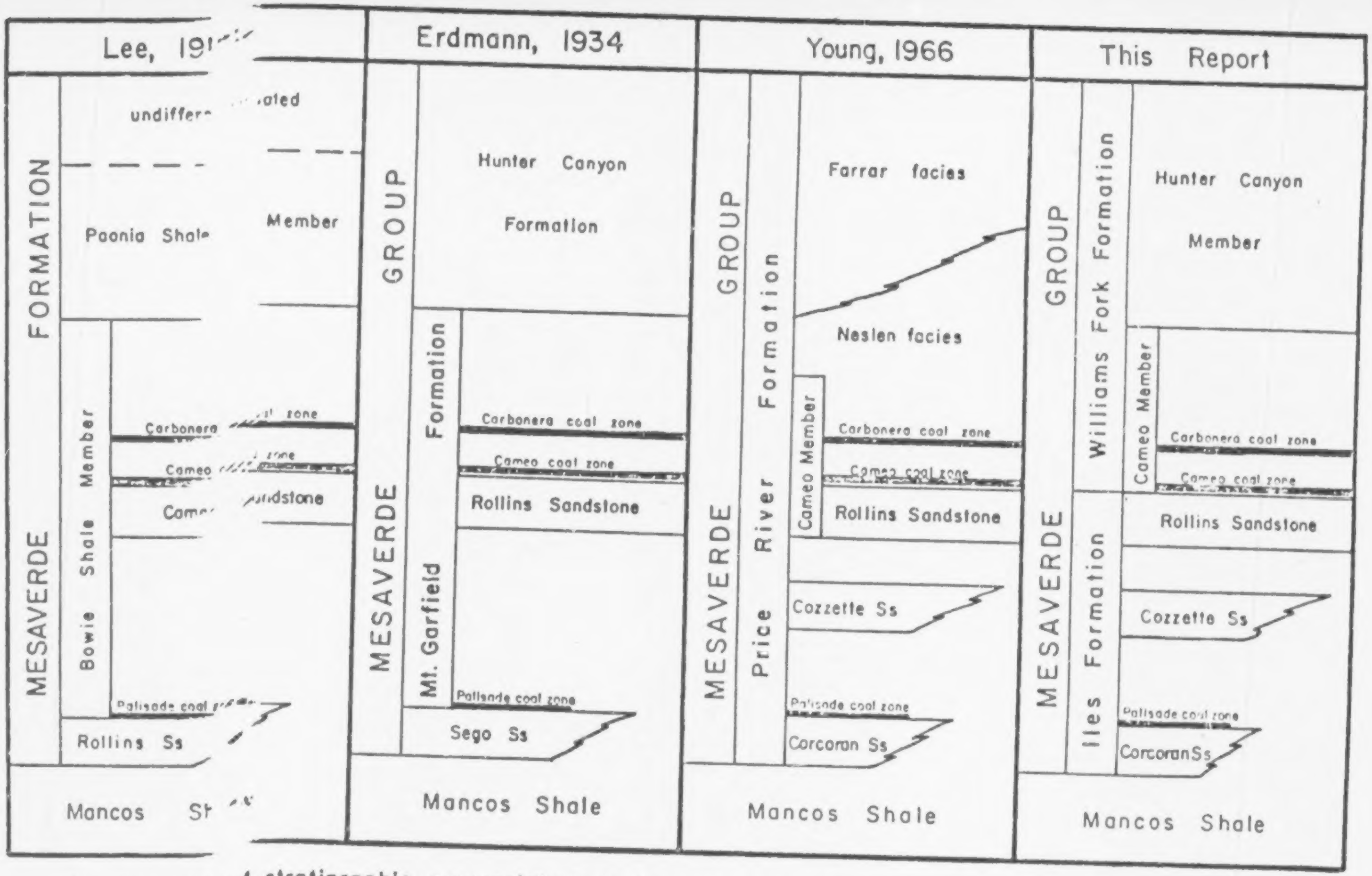
The only significant coal in the Iles Formation in the Coal Canyon area is the Palisade seam. The Palisade was tested in 5 holes during a 1963-64 drilling program carried out by a previous owner. In these 50 holes, Palisade thickness varies from 3.67 feet to 7.83 feet in thickness (including partins), and averages 5.99 feet.

There is no available quality data on the Palisade in the Coal Canyon area. The following summary gives average values from 5 cores taken in the Cottonwood Creek area, 3 to 5 miles east of the Coal Canyon:

Moisture	7.58%
Btu, as received	11,161
Ash, dry	15.11%
Volatile Matter, dry	36.80%
Fixed Carbon, dry	48.08%
Btu, dry	12,061
Sulfur, dry	1.07%

No attempt has been made to derive a detailed reserve figure for the Palisade seam. However, a reasonable estimate can be made, assuming that the seam is present at a mineable thickness over the eastern half of the properties. Assuming, then, 1,010 acres at an average thickness of 5.99 feet, a reserve of 10,539,000 tons in-place (5,269,000 tons at 50 percent recovery) would exist. Erratic thicknesses and partings, however, together with depth in the northwestern part of C037277, may preclude the exploitation of the Palisade in this area.

The top of the Rollins Sandstone marks the base of the Williams Fork Formation, which contains virtually all of the commercial coal deposits of the eastern Piceance Basin. The lower portion, the Cameo coal zone, is notable for the thickness of its seams and its great extent. It has


Lee, 19
undiffer ated
Paonia Shale
Member
FORMATION
MESAVERDE
Bowie Shale Member
Carbonera zone
Cameo zone
Cameo ndstone
Palisade coal
Rollins Ss
Mancos Sh
Erdmann, 1934
GROUP
MESAVERDE
Hunter Canyon Formation
Formation
Mt. Garfield
Carbonera coal zone
Cameo coal zone
Rollins Sandstone
Palisade coal zone
Sego Ss
Mancos Shale
Young, 1966
GROUP
MESAVERDE
Price River Formation
Farrar facies
Neslen facies
Cameo Member
Carbonera coal zone
Cameo coal zone
Rollins Sandstone
Cozzette Ss
Palisade coal zone
Corcoran Ss
Mancos Shale
This Report
GROUP
MESAVERDE
Williams Fork Formation
Hunter Canyon Member
Cameo Member
Carbonera coal zone
Cameo coal zone
Rollins Sandstone
Iles Formation
Cozzette Ss
Palisade coal zone
CorcoranSs
Mancos Shale

Development of stratigraphic nomenclature in the eastern-most portion of the Book Cliffs coal field been the most productive zone in the Book Cliffs coal field. The interval between the Cameo and the underlying Palisade on the Coal Canyon properties varies from 416 to 439 feet and averages 425 feet. The interval between the Cameo and the overlying Carbonera is not accurately known, but appears to range from 21 to 98 feet and averages 53 feet. This interval generally consists of thin coals and carbonaceous laminated sandy siltstones, although significant sandstones (over 10 feet thick) are present in several of the 54 existing test holes. The Cameo seam in the Coal Canyon area occurs in from 1 to 3 or more benches. Two benches, separated by 0 to 20 feet of sandstone and shale, is the most common, although a single bed varying from 6 to 20 feet in thickness dominates the central portion of the properties.

While difficult to correlate in many of the available drill holes, the Cameo in this area has been divided into two benches, the A and the B; where the two benches appear to come together, the seam is considered the Cameo B. In the Coal Canyon area, The Cameo B, so defined, varies from 0.67 feet (doubtful data) to 20.42 feet in thickness, averaging 9.11 feet. The Cameo A varies from 0.17 feet to 12.34 feet, averaging 3.60 feet. The interval between the benches varies from 0 to 20.17 feet. The benches commonly contain 1 or more splits; partings are included in the thicknesses above.

Quality of the Cameo as indicated from cores on the nearby Cottonwood Creek properties averages as follows:

Moisture, as received	7.68%
Btu, as received	10,224
Ash, dry	19.71%
Volatile Matter, dry	35.85%
Fixed Carbon, dry	44.43%
Btu, dry	11,082
Sulfur, dry	0.92%

The Carbonera coal zone overlies the Cameo at distances ranging from 21 to 98 feet on the Coal Canyon properties, averaging 53 feet. The

Carbonera throughout its extent appears to be a series of detached coal seams and lenses rather than a distinct bed, making correlation difficult.

Because of the extreme correlation problems encountered with the Carbonera in the Coal Canyon area, no reserve estimates have been made. Indeed, there may not be any Carbonera mineable by underground methods on the properties.

Two underground mine areas will be developed to mine the Cameo saam recoverable on the property. The mine areas will be separated by a fault located at about the center of the property. Mine run coal will be transported to preparation plant facilities for processing. Auger mining will be used to recover coal from areas along the outcrop which have cover too shallow for recovery from the underground mines. Surface strip mining is not planned, except that for access purposes it will be necessary to cut back the outcrop area. Surface operations contemplated will be those incidental to underground mining and auger mining.

There is one seam, the Cameo, believed to be mineable on the property. Data available on the Palisade seam, located stratigraphically about 450 feet below the Cameo is not sufficient to allow plans to be made at this time. The Cameo seam outcrops north of the canyon along most of the property. Plans are basically to enter the east portion of the property at the outcrop developing the east portion of the property first, then progressing to the west.

Two different mine concepts are planned for the two areas. The area east of the fault will involve a punch mine concept, with multiple entry locations, based on a combination of longwall extraction following continuous miner development. The area west of the fault does not appear to be suitable for longwall techniques due to the projected dip increases, and the limited access which restricts ability to develop suitable longwall panels. This area is planned for room and pillar extraction using continuous miners.[1] A corridor has been reserved in each mine area for access to the coal located to the north of the present leases.

It is expected that the mines will produce in excess of 500,000 tons of raw coal annually at full production. This indicates a property life of 15 - 25 years based on current reserve estimates. Initial production will be in the 100,000 ton per year rate with full production reached in about three years.

Plans are to construct a preparation plant and possibly a dryer. The preparation plant will discharge clean coal to a clean coal storage-loadout facility. The clean coal will be transported by trucks or other means to a unit-train loadout facility located north of the Cameo power plant. The unit-train facility is in the preliminary planning stages by Cambridge Mining Company.

Coal haulage from the sections to the portals will probably be with conveyor belts. Supply and personnel transportation in the mine will be by MESA approved electric and/or diesel powered equipment with the possiblity of the use of rails or tracks for main systems. Secondary mining will be by longwall methods and/or continuous miners generally using fully retreating systems.

Reserve calculations indicate potential reserves in the 15 to 25 million ton range, depending upon how mineable the Palisade seam is and on what types of recovery rates can be attained. At 500,000 tons per year this is a mine life of 15 to 25 years.

Currently no firm market is established. It is anticipated that the market will be a utility company outside of Colorado. Negotiations to date indicate there are adequate markets, once the questions of timing related to permit approvals and access road right-of-way are firmed up.

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[1] It is anticipated that a continuous miner section will consist of a continuous miner, two shuttle cars, or continuous haulage belts, a feeder breaker, a section power center, and a roof-bolting machine.

Two basic types of refuse material are expected from the operation. There will be combustible materials from the service area and from the mine. This material will be primarily paper, wood, garbage from lunches and similar material. This type of refuse will either be disposed of on site or transported to applicable area disposal facilities. If disposed of on site, all pertinent governmental regulations will be followed.

Shale, bone coal, parting material and similar refuse will be removed from mine-run coal at the preparation plant. This refuse will probably amount to over 150,000 tons per year at planned mine capacity. The refuse will first be used for fill material to aid in development of the mine site, and then will be disposed of in the northern part of sec. 5, T. 11 S., R. 98 W. and the southern portion of sec. 31, T. 10 S., R. 98 W. Disposal and revegetation will be accomplished according to existing guidelines.

STATE: COLORADO **REGION:** UINTA **COUNTY:** MESA

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
COAL CANYON	MID-CONTINENT COAL AND COKE CO	C037277		1471.37		U/G	INCOMPLT M.P.	0.5 TPY
		C059420		308.21				
		D040389		241.28				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 15.851

SOURCE:

CENTRAL BIS

All Figures Shown In Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: UINTA COUNTY: MESA

MINE NAME (OR LEASE BLOCK): COAL CANYON

LESSEE(S) (OR OPERATOR): MIDCONTINENT

NUMBER OF LEASES IN BLOCK OR PLAN: 3

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	PALISADE	CAMEO	CARBONERA					
FORMATION	ILES	〃						
RANK								
THICKNESS	3.7' to 7.8'	9.11						
Btu/LB DRY	12,061	11,082						
SULFUR (%) DRY	1.07	.92						
ASH (%) DRY	15.11	19.71						
MOISTURE (%) AS RECEIVED	7.58	7.68						
FIXED CARBON (%) DRY	48.08	44.43						
VOLATILE (%) DRY	36.8	35.85						
SEAM DEPTH								
IN-PLACE RESERVES	10.539							
RECOVERABLE RESERVES	5.269							
RECOVERY RATE	50							

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			15.851	CENTRAL EIS

NOTES: DIP RANGES from 3° to 18°

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO REGION: UINTA COUNTY: MESA

MINE NAME OR LEASE BLOCK: COAL CANYON

LESSEE(S): MID-CONTINENT

NUMBER OF LEASES: 3

DATE MINE OPENED: 1986

PROJECTED CLOSING DATE: 2013

REMAINING MINE LIFE: 33

REMAINING RECOVERABLE RESERVES:

FEDERAL: 15.851

NON-FEDERAL:

MINE DESIGN CAPACITY 0.5

RECOVERY RATE:

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983			
1984			
1985			
1986	0.1		
1987	0.2		
1988	0.3		
1989	0.4		
1990	0.5		
Post 1990	14.351		

NOTES: LONGWALL & CONTINUOUS MINERS

All Figures Shown In Million Tons

PRODUCTION SUMMARY

COTTONWOOD CREEK
MID-CONTINENT RESOURCES. INC.
MAP LOCATION C - 24

FEDERAL COAL LEASES:	C020740	(40.00 Acres)
	C024998	(2,550.92 Acres)
	C029889	(2,522.37 Acres)
	FEE LAND	(454.04 Acres)

MESA COUNTY, COLORADO

The Cottonwood Creek coal mine is located approximately 2.5 miles northeast of Palisade, Colorado, in Mesa County.

The majority of the Cottonwood Creek coal property is Federal land (5,113.29 acres). The remaining Fee land (454.04 acres) is leased from individual owners or has been obtained as fee simple land.

That portion of the Mesaverde Group below the top of the Rollins Sandstone and above the base of the lowest sandstone in the upper Mancos is here designated the Iles Formation. In the vicinity of the Cottonwood properties, therefore, the Iles include the Corcoran, Cozzette, and Rollins Sandstone Members and is approximately 450 feet thick. The Iles represents the intertonguing of the prodelta muds and silts of the Mancos Shale with complex delta-front sandstones, the Corcoran, Cozzette, and Rollins.

The only significant coal in the Iles Formation in the Cottonwood Creek area is the Palisade seam (see Figure 1). The Palisade was tested in 7 holes during the 1976-77 drilling program. The seam thins rapidly southeastward from the outcrop in the vicinity of the Midwest mines, where it is 3 to 4 feet thick. The thickest coal, 4.60 feet, was in the north-central part of the property; the seam thins to the west, south, and east of this point.

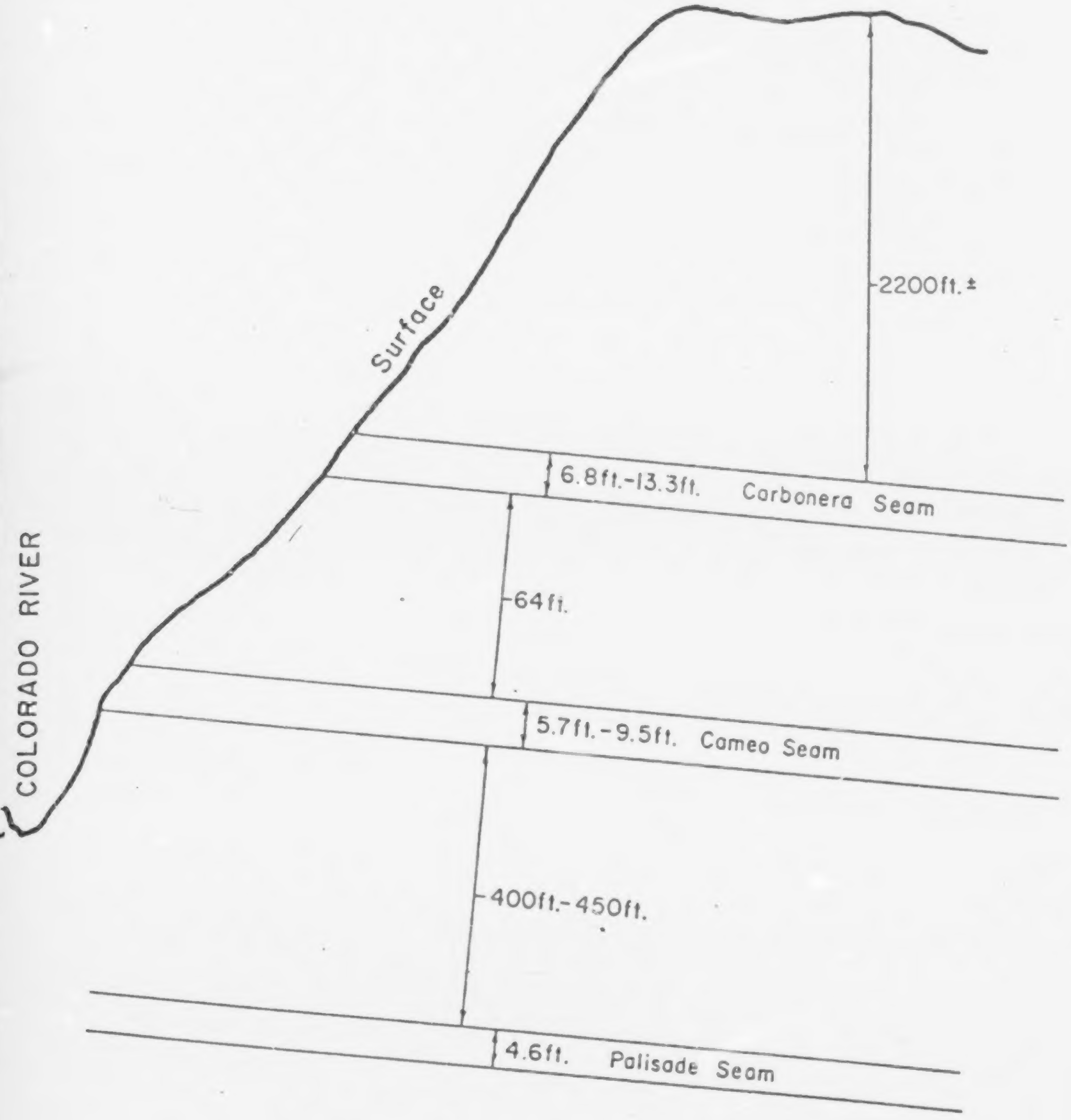
Quality of the Palisade in the holes tested averages as follows:

Moisture, as received	7.58%
Btu, as received	11,161
Ash, dry	15.11%
Volatile Matter, dry	36.80%
Fixed Carbon, dry	48.08%
Btu/ dry	12,061
Sulfur, dry	1.07%

Detailed reserve calculations have not been made for the Palisade due to its disappointing thickness. An estimate of 13,000,000 tons in-place at an average thickness of 2.5 feet over about 3,000 acres of the property can be derived. The interval between the Palisade and the overlying Cameo seam varies from about 400 to 450 feet.

The top of the Rollins Sandstone marks the base of the Williams Fork Formation, which contains virtually all of the commercial coal deposits of the eastern Piceance Basin. This lower portion, here termed the Cameo Member (see Figures 1 and 2) after Young's Cameo to which it is only partially equivalent, contains the coal beds and coaly siltstones associated with the Cameo and Carbonera coal zones.

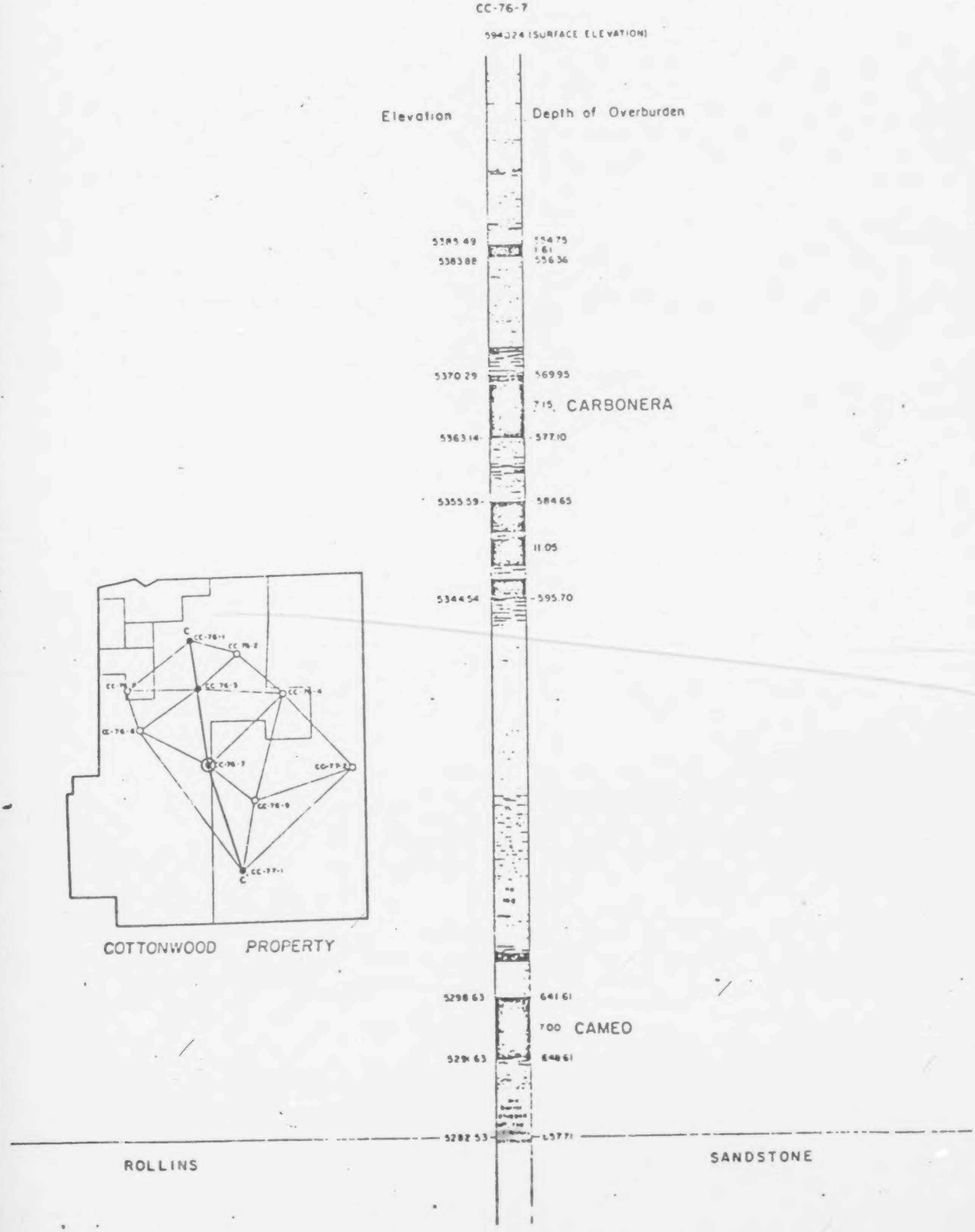
The Cameo coal zone is notable for the thickness of its seams and its great extent. It has been the most productive zone in the Book Cliffs coal field. One of the chief characteristics of the Cameo coal is the relatively large amount of bone-coal whose ash content commonly exceeds 50 percent. Carbonaceous shale beds are occasionally present within the coal seam. The lower foot or so commonly contains grains of wind-blown quartz sand, especially where the lower boundary is immediately above the Rollins Sandstone, from which the coal is separated on the Cottonwood properties by 5 to 30 feet of sandy carbonaceous siltstone and silty sandstone, often somewhat coaly. Another distinctive feature of the Cameo is the presence of sandstone dikes. These dikes vary from inches to several feet in thickness and may intrude all or only part of the seam. The Cameo ranges from 5.66 to 9.51 feet in thickness, averaging 7.61 feet, in the 10 holes in which the full seam was recovered or


Surface
2200ft.±
6.8ft.-13.3ft. Carbonera Seam
64ft.
5.7ft.-9.5ft. Cameo Seam
400ft.-450ft.
4.6ft. Palisade Seam
COLORADO RIVER

igure MB2-1. Schematic of coal seams
t the proposed Cottonwood No. 1 and
o. 2 mines

Fig 1

TYPICAL DRILL HOLE PROFILE


CC-76-7
594024 (SURFACE ELEVATION)
Elevation
Depth of Overburden
5385.49
554.75
1.61
5383.88
556.36
5370.29
569.95
7.15 CARBONERA
5363.14
577.10
5355.59
584.65
11.05
5344.54
595.70
5298.63
641.61
7.00 CAMEO
5291.63
648.61
5282.53
657.71
ROLLINS
SANDSTONE
C
CC-76-1
CC-76-2
CC-76-3
CC-76-4
CC-76-6
CC-76-7
CC-77-2
CC-76-9
CC-77-1
C'
COTTONWOOD PROPERTY

NOTE. See accor ng drill hole log for complete lithology

FIG 2

measured by electric/radiation logging. It is thickest in the north and northwestern part of the properties and appears to thin to the southeast. These thicknesses include bony coal and siltstone partrings, where present.

Quality of the Cameo averages as follows:

Moisture, as received	7.68%
Btu, as received	10,224
Ash, dry	19.71%
Volatile Matter, dry	35.85%
Fixed Carbon, dry	44.43%
Btu, dry	11,082
Sulfur, dry	0.92%.

Preliminary reserve estimates have been made by planimetering thickness increments on "nearest neighbor" triangulation map. The Cameo seam covers about 5,040 acres of the property at an average thickness of 6.46 feet, and contains an estimated 56,734,000 tons of coal in-place, or 28,367,000 tons at 50 percent recovery. No provision has been made in these figures for restrictions caused by cover depth. Some reduction for those reserves under more than 2,000 feet of cover may be necessary.

The Carbonera coal zone overlies the Cameo at distances ranging from 38 to 93 feet on the Cottonwood properties, averaging 64 feet. The Carbonera throughout its extent appears to be a series of detached coal seams and lenses rather than a distinct bed, making correlation difficult. In some areas, such as in Coal Canyon to the northwest of the Cottonwood properties, the entire interval from the top of the Rollins is interbedded with sandstone. Roof control and bottom heaving may cause mining problems, and even restrict mining in the Carbonera.

STATE: COLORADO **REGION:** UINTA **COUNTY:** MESA

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
COTTONWOOD CREEK	MID-CONTINENT RESOURCES, INC.	C020740 C024998 C029889	5567.33	40.0 2550.92 2522.37	FEE 454.04	U/G	INCOMPLT M.P.	1.0

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 124.712

RECOVERABLE: 62.356

SOURCE: MINE PLAN

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: COLORADO REGION: UINTA COUNTY: MESA

MINE NAME (OR LEASE BLOCK): COTTONWOOD CREEK

LESSEE(S) (OR OPERATOR): MIDCONTINENT

NUMBER OF LEASES IN BLOCK OR PLAN: 3

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	PALISADE	CAMEO	CARBONERA					
FORMATION	ILES							
RANK								
THICKNESS	3'-4'	7.6'	8.65'					
Btu/LB Dry	12,061	11 082	11,232					
SULFUR (%) Dry	1.07	0.92	0.87					
ASH (%) Dry	15.11	19.71	20.12					
MOISTURE (%) As received	7.58	7.68	7.16					
FIXED CARBON (%) Dry	48.08	44.43	43.84					
VOLATILE (%) Dry	36.86	35.85	36.05					
SEAM DEPTH								
IN-PLACE RESERVES	13.0	56.734	67.978					
RECOVERABLE RESERVES		28.367	33.989					
RECOVERY RATE		50	50					

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			124.712	M.P.
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND	49.88		62.356	

NOTES:

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: COLORADO **REGION:** UINTA **COUNTY:** MESA

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	DATE MINE OPENED: 1987 PROJECTED CLOSING DATE: 2017 REMAINING MINE LIFE: 30
COTTONWOOD CREEK	MID-CONTINENT	3	
REMAINING RECOVERABLE RESERVES: FEDERAL: 49.88 NON-FEDERAL:	MINE DESIGN CAPACITY RECOVERY RATE: 50		CUMULATIVE PRODUCTION TO 1979: 1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983			
1984			
1985			
1986			
1987	.2671		
1988	↓		
1989			
1990			
Post 1990			

NOTES: LONGWALL ANDCONTINUOUS MINERS

All Figures Shown in Million Tons

PRODUCTION SUMMARY

ROADSIDE MINE
GEX COLORADO, INC.
MAP LOCATION C -22
FEDERAL COAL LEASE: C078049
MESA COUNTY, COLORADO

The Roadside mine, located in the eastern part of the Book Cliffs Coal Field (Palisade coal district) in Mesa County, Colorado, is owned and operated by GEX Colorado, Inc. (a subsidiary of General Exploration Company). The mine is located in DeBeque Canyon about four miles northeast of the town of Palisade, Colorado, near the Colorado Public Service Company power plant at Cameo. The Roadside property lies primarily on the east side of the Colorado River. The main line of the Denver and Rio Grande Western Railroad and Interstate Highway 70 parallel the Colorado River only a short distance from the mine.

Tracts comprising the Roadside mine include:

Property Description	Acres
Fee lands in secs. 34 and 35, T.10 S., R.98 W., Sixth Principal Meridian and in secs. 1 and 2, T. 11 S., R.98 W. Sixth Principal Meridian	560*
Federal Coal Lease C078049 comprised of tracts in secs. 26 and 35, T.10 S., R.98 W., Sixth Principal Meridian	809.99
Total acreage	1,369.99*

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*estimated acreage

An application has been made for additional Federal lands contiguous to Federal coal lease C078049 in sec. 26, T. 10 S., R. 98 W. Other Federal leases on permits in the immediate vicinity of Federal coal lease

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CO78049 include: CO29889, 2,522.37 acres located in secs. 1 and 6, T.11 S., R. 98 W.; CO24998, 2,550.92 acres located in sec. 1, T.11 S., R.98 W.; CO20740, 40 acres located in sec. 2, T.11 S., R.98 W.; and a prospecting permit application for secs. 25 and 26, T.10 S., R.98 W.

Coal in the Book Cliffs coal field occurs in the Palisade and Cameo coal zones in the Upper Cretaceous Mount Garfield Formation of the Mesaverde Group.

The most productive coal zone, the Cameo, is noted for its seam thickness and wide areal extent. Much of the coal zone is bony with rapid changes occurring between clean and bony coal.

The coal zone commonly has one or two workable seams. The principal coal seam, the one mined at the Roadside mine, is the Cameo "B" seam which is approximately six to seven feet thick. A rider seam, the Cameo "C" coal seam, (approximately two to four feet thick) is separated from the "B" seam by two to six feet of shale and sandstone. It is generally bony and of a low Btu content (less than 8,000 Btu when washed) so extraction is not feasible. Several other Cameo coal seams, the "D," "E," and "F," overlying the main "B" seam are too thin (about two feet) and discontinuous to be considered mineable. Overburden depths range from 100 to 2,500 feet above the Cameo "B" seam.

The Roadside mine lies on the southern rim of the Piceance Creek Basin where the strata dip gently (3°) to the north-northeast (N.30°E.). There is no evidence of any major faulting in the immediate area of the mine.

Coal produced from the Cameo seam in the Palisade coal district is classified as high-volatile B bituminous. An average as-received proximate analysis derived from 97 samples of Cameo seam coal is as follows:

Moisture	7.9%
Volatile matter	35.4%
Fixed carbon	46.6%
Ash	9.9%
Sulfur	0.7%
Btu/lb	11,700

Mining of the Federal lease was initiated early in 1976. Current mine plans (as of March, 1979) indicated that the remaining recoverable reserves at the Roadside property (65 percent recovery rate from room and pillar panels and 90 percent recovery rate from longwall panels) were 7,192,000 tons. The estimated remaining life of the Roadside mine is approximately six years (to March, 1986). The peak recovery rate is estimated to be 1,240,000 tons per year with 248,000 tons per year from room and pillar and 992,000 tons per year from longwall operations. Approximately 26 percent of this raw coal will be rejected during washing.

The C078049 lease is adjacent to the old Roadside underground mine which is private surface and coal. Access to Federal coal is through the old workings. All surface structures are on private land. The mine was developed using a seven-entry system extending from the private land through Federal coal to the limits of the lease. Panels are being mined using continuous mining equipment in room and pillar extraction in areas of 100 to 500 feet of overburden; and longwall extraction in areas of 500 to 2,500 feet of overburden. The full thickness (six feet) of the Cameo "B" seam is being extracted.

Coal is delivered to both the Colorado Public Service Company power plant across the Colorado River at Cameo, and by unit-train to the Arizona Electric Power Company.

CO-45

Production Capability Analysis

GEX Colorado's plans for the operation of the Roadside Mine are highly interleaved with its plans for the Cameo #1 and Cameo #2 LMU. This is possible because the Raodside property is located less than a mile away from the other two mines and because it is mining in the same seam with nearly identical mining conditions.

This approach makes it possible for the company to initially equip the Roadside Mine with as many as six continuous miners to mine a relatively small amount of reserves at a very high production rate. As the mine is readied for longwall production, the method which has been chosen to produce more than 50 percent of the recoverable reserves now remaining the continuous miners will be gradually transferred to the Cameo #1 Mine as operations get underway there. Two of the continuous miners will remain in use at the Roadside until 1984 and these units will also be transferred over to the Cameo Mines. Needless to say, the flexibility in equipment scheduling which can result from this kind of situation can provide considerable operating advantages which will be reflected in lower operating costs.

The planned extraction rates of 65 and 90 percent for the room and pillar and longwall operations, respective seem quite reasonable. The mine plan has been prepared with the intent of limiting the room and pillar mining to areas in the mine where the depth of cover is 500 feet or less. Considering that the roof material is a highly competent sandstone, the

the 65 percent recovery rate should provide more than sufficient safety for this relatively shallow depth of cover providing that the secondary recovery of pillar material is done properly.

As with all longwall mining operations, consideration must be given to the amount of subsidence that will result and what impact this subsidence will have. In the case of the Roadside Mine, the removal of a 6 to 7-foot thick seam should result in minimal subsidence at the surface. In any event, the surface land which will be impacted is remote mesa tops. Current usage of this land is limited to grazing, so whatever substance that does occur will have no adverse effects.

The relatively high/26 percent reject rate in the coal preparation plant means that considerable amounts of waste material will be generated over the life of the mine. Disposal of this material in the Colorado River valley where the preparation plant is located would be quite unacceptable. The solution the company has proposed to OSM provides for pumping this reject material into mined out portions of the mine as a slurry. Since this material will be barricaded off from active areas of the mine by well constructed walls with provision for draining away excess water, this approach will provide a safe and environmentally acceptable way of dealing with the problem.

The Roadside Mine is located approximately 200 yards from a rail loadout facility that is located adjacent to the mainline of the Denver & Rio Grande Western Railroad. Mine run coal is is transferred by conveyor belt to the coal preparation plant. After processing, the coal is stockpiled until required for loading on a unit train. This system should remain entirely adequate throughout the life of the mine.

Diligent Development Analysis

The production system currently planned for and being implemented at the Raodside Mine is far more than the identified reserves would normally justify. This can in part be justified by the intention to transfer part of the equipment to the Cameo Mines. However, the longwall equipment will have only been in use six years when the existing reserves are exhausted. The fact that the company has already made application for federal leases adjoining the currently held lease would indicate that the present Roadside LMU is only a portion of that which the company envisions.

Until the time the additional leases are granted, if they are granted, the existing LMU must be considered to be fully in compliance with the requirements for diligent development and continuous operation.

STATE: CO **REGION:** UINTA **COUNTY:** MESA

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
ROADSIDE MINE	GEX COLORADO, INC. (SUBSIDIARY OF GENERAL EXPLORATION CO.)	C-078049	1,369.99 ESTIMATED	809.99	560 ESTIMATED	U/G	APPROVED 1-3-77	1.24 M TPY

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 7.192 M TPY

SOURCE:

LESSEE MINE PLAN MODIFICATION 3-21-79

All Figures Shown In Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Co REGION: UINTA COUNTY: MESA

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
ROADSIDE MINE	GEX COLORADO, INC.	1	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	"B"							
FORMATION	MOUNT GARFIELD							
RANK	hvBb							
THICKNESS	6'							
Btu/LB *	11,700							
SULFUR (%)	0.7							
ASH (%)	9.9							
MOISTURE (%)	7.9							
FIXED CARBON (%)	46.6							
VOLATILE (%)	35.4							
SEAM DEPTH	100'-2,500'							
IN-PLACE RESERVES								
RECOVERABLE RESERVES	7.192 M TONS							
RECOVERY RATE	65% & 90%							

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL			7.192	LESSEE MINE PLAN
	SURFACE			—	
	UNDERGROUND	5.0		7.192	

NOTES: * ANALYSIS DERIVED FROM 97 SAMPLES OF CAMEO SEAM COAL

65% RECOVERY RATE ROOM & PILLAR -0.248 M TONS PER YEAR, 90% RECOVERY RATE LONGWALL, -0.992 M TONS PER YEAR. 26% OF RAW COAL REJECTED DURING WASHING

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: CO **REGION:** UINTA **COUNTY:** MESA

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	
ROADSIDE MINE	GEX COLORADO, INC	1	DATE MINE OPENED: EARLY 1900'S PROJECTED CLOSING DATE: MARCH 1986 REMAINING MINE LIFE: 6 YEARS

REMAINING RECOVERABLE RESERVES:

FEDERAL: 5.0

NON-FEDERAL:

MINE DESIGN CAPACITY

1.24 MTPY

RECOVERY RATE: 65% & 90%

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	0.992		ARIZONA ELECTRIC POWER CO
1981	0.992		
1982	1.240		
1983	1.240		
1984	0.744		
1985	0.744		
1986	0.248		
1987			
1988			
1989			
1990			
Post 1990			

NOTES:

All Figures Shown In Million Tons

PRODUCTION SUMMARY

#1

YAMPA FIELD LEASE
AMCA COAL LEASING
MAP LOCATION C-7
FEDERAL COAL LEASE: D051376
ROUTT COUNTY, COLORADO

The federal lease held by AMCA Coal Leasing in the Yampa Coal Field contains only 250.41 acres. It is not located adjacent to any other existing leases. However, AMCA Coal Leasing has filed for exploration permits on 1428.89 acres of land adjacent to the existing lease to the southwest and to the north.

Total reserves available on the lease are reported to be 1.8 million tons. They consist of a 13-foot seam overlain by approximately 150 feet of overburden. Although the total reserves are quite limited, it is conceivable that they could support either a small underground or surface mining operation. The companies present strategy appears to be one of attempting to locate additional reserves on adjoining lands to be able to develop a larger scale operation.

Diligent Development Analysis

Thus far, AMCA Coal Leasing has not yet submitted a mining plan for its Yampa Field lease. It therefore appears unlikely that the company will be able to have a mine in operation by 1986. If the company does locate additional coal adjoining the existing lease, it could be in operation by 1991. It is considered unlikely that the company will decide to develop a mine base solely on the currently identified reserves.

YAMPA FIELD LEASE

W. R. Grace, Inc.

Map Location C.

Federal Coal Lease: C0125957

Moffat County, Colorado

The Yampa Field lease of the W.R. Grace Company is located in eastern Moffat County. It is separated from existing producing leases in Moffat County by approximately 40 miles. The lease contains 3863 acres.

The reported reserves for Grace's lease are 15.8 million tons. There is no information available as to how the reserves are distributed over the lease or as to the seam thickness. If the reserves are located over a significant portion of the lease, then the indication would be that the seam is rather thin because of the limited number of tons of coal per acre. Since it has been reported that the overburden thickness ranges up to 200 feet, the stripping ratio will be rather high.

Grace has announced that coal produced from the lease will provide feed for a large synfuels plant. If this is the case, then the company will have to obtain considerable additional coal supplies for the plant.

Diligent Development Analysis

Because of the lack of available information on coal quality or seam thickness for the lease, it is difficult to access the probability for development. If the seams are of sufficient thickness for extraction by surface or underground methods and the coal quality is adequate, then the property could be economically viable.

Since the company has not yet submitted a mining plan, it is considered unlikely that a mine could be in production by 1986. However, if the company does decide to proceed, then it is quite likely that it could be in operation by 1991.

#6

YOAST TRACT
PEABODY COAL COMPANY
MAP LOCATION C-11
FEDERAL COAL LEASE: C0114093
ROUTT COUNTY, COLORADO

The Yoast Tract is located midway between Peabody Coal Company existing Seneca and Seneca 2-W mines in Colorado. The federal lease, C0114093, is listed as 1320 acres in size.

There is little site specific information available. The indication is that the coal mined from the lease will be shipped to the Hayden power plant, the current destination of coal mined from the Seneca and the Seneca 2-W LMU's. The June 1976 EIS for Northwestern Colorado states that production is not scheduled to begin until 1995.

Recoverable reserves are estimated to be six million tons. If conditions are similar to those that prevail on the Seneca and Seneca 2-W tracts, and it is reasonable to project that they are, then Peabody will have not difficulty in mining the reserves economically.

Diligent Development Analysis

If Peabody's plans for the Yoast Tract remain as they are stated in the regional EIS, the tract will not be in production by either 1986 or 1991. If the issue is forced and Peabody is faced with the loss of reserves, then the company's logical course of action is to modify the currently approved plan for the Seneca 2-W LMU so that mining can begin on the Yoast Tract by either 1986 or 1991. According to Peabody, the coal in this lease is already under contract for the Hayden powerplant and production is likely to begin by 1986 at current rates. The fact that the coal is committed under contract might qualify Peabody for an extension of the 1986 diligence deadline.

#8

YAMPA FIELD TRACT
PEABODY COAL COMPANY
MAP LOCATION C-11
FEDERAL COAL LEASE: C088199
ROUTT COUNTY, COLORADO

This Peabody Coal Company held federal coal lease C088199 is comprised of 2280.0 acres of land and is located approximately 15 miles northeast of Peabody's Seneca mine near Hayden, Colorado.

The limited information available on the tract indicates in-place reserves of 77 million tons in three seams; the Williams Fork; the Wolf Creek, and the Wadge. Coal quality data for other leases in the vicinity shows BTU values in the range of 10,000 to 11,000 with sulfur content of less than 0.5 percent. If the coal on this tract is of comparable quality, then it can be sold on the steam coal market.

Peabody's currently operating mines in this area, the Seneca and the Seneca 2W, together with the Yoast tract are scheduled to supply coal to the Hayden power plant until after the year 2000. It is not known, but is possible, that Peabody is looking at this tract as a continuing source of coal for that plant.

Diligent Development Analysis

It is highly unlikely that Peabody will have this tract in production by 1986. However, considering the quantity and quality of the reserves, there is a definite incentive for the company to continue with the development and have the lease in production by 1991.

#9

SUN MINE

RUBY CONSTRUCTION COMPANY

MAP LOCATION C-11

FEDERAL COAL LEASE: D051698

ROUTT COUNTY, COLORADO

The proposed Sun Mine would be operated by Ruby Construction Company on 146.26-acre federal coal lease D051698 which is located approximately 10 miles southwest of Hayden, Colorado on county road 53.

The Sun property was discussed in the June 1976 final EIS for northwestern Colorado. The EIS discussion was based on a submitted, but unapproved, mine plan which described a 3-entry room and pillar operation to recover coal form the 8-foot-thick No. 3 seam and the 6-foot-thick No. 1 which is located 125 feet below the No. 3 seam. Of the estimated three million tons of in-place reserves, this approach would have recovered 1.4 million tons. The estimated annual production rate in the original plan was 200,000 to 300,000 tons.

There are indications that the company is reconsidering the original approach. Since the uppermost seam, the No. 3, is covered by less than 120 feet of overburden, there is a possibility of mining that seam with a surface method and using an underground method for the lower seam.

The seam thickness for the two seams and the depth of cover on the lease both indicate that there is the opportunity for a small company like Ruby Construction to develop a small but economically viable coal mine. Since the coal recovery would be greater and the mining costs lower, the use of a surface mining method for the upper seam is reasonable. The 1.7 million tons in this seam could be produced in approximately 8 years, assuming a 200,000-ton-per-year production rate and a recovery rate of 90 percent. The remaining 1.3 million tons in the lower seam could be mined out in an additional three years; assuming the same annual produciton rate, a 50-percent recovery rate, and two continuous miner shifts a day for 250 operating days per year.

Diligent Development Analysis

Since Ruby Construction Company has not yet submitted a revised mining plan, it is considered unlikely that it can have the Sun mine in production by 1986. If the company does begin to actively puruse the development of the lease, it can be in production in 1991. However, the tract does not appear to qualify for any of the permissable extensions of the diligence period under the 1976 regulations.

#12, 14, 15

DANFORTH HILLS TRACT

CONSOLIDATION COAL COMPANY

MAP LOCATION C-6

FEDERAL COAL LEASES: C1546
C093713
C093714
C093715
C093716

RIO BLANCO COUNTY, COLORADO

The Danforth Hills Tract held by Consolidation Coal Company is a block of five leases with a combined federal lease acreage of 8892.88 acres. The tract is located 10 miles northeast of Meeker, Colorado and is adjacent to the currently operating Meeker Area Mines complex which is operated by Northern Energy.

Data available on the Northern Energy property indicates that the total number of seams in the area is in excess of 20. Northern Energy has plans to mine coal from 5 of these seams. BTU content of the coal ranges from 10,000 to 11,000 and sulfur content from 0.3 to 0.45 percent. The current estimate of recoverable reserves for Consol's tract includes 120 million tons of surface mineable coal and 123 tons that can be recovered using underground methods.

Mining conditions on the tract include seams that range from 10 to 25 feet in thickness and dip angles in the range of 15 to 20 degrees. This combination is going to require the use of more innovative techniques, such as multiple-life longwall, to maximize coal extraction. The generally shallow depths of the seams, less than 500 feet, will be a definite advantage.

Diligent Development Analysis

The quantity and the quality of the reserves available on Consol's Danforth Hills Tract, together with the relatively good mining conditions, strongly indicate that this tract will be developed. However, there is not sufficient time remaining between now and 1986 for the leases to be in production by that time. There is a real value in delaying the development of the leases and not rushing to put the mines into production to satisfy due diligence requirements because it will allow additional time for perfection of thick-seam recovery techniques. Given the large amount of reserves on this tract, it is conceivable that the lessee might qualify for an extension under the large mine exception.

#16

DANFORTH HILLS TRACT

UTAH, INTERNATIONAL

MAP LOCATION C-2

FEDERAL COAL LEASE: C0123476

MOFFAT COUNTY, COLORADO

The Danforth Hills Tract held by Utah, International consists of a single 2255.22 acre federal lease located approximately 15 miles north of Meeker, Colorado and adjacent to the Colowyo Coal mine.

The tract contains a series of seams that may be surface mineable down to a depth as great as 800 feet. Total reserves for the property are estimated to be 170 million tons. The total tons of coal which will ultimately be recovered from the property will depend on how deep surface mining can actually extend. The current projection is that 150 million tons will be recovered by surface mining and 11 million tons by underground mining.

The average coal quality data for the eight mineable seams at the adjoining Colowyo mine shows a BTU content of 10,728 and a sulfur content of 0.4 percent. It is reasonable to project that the coal quality for the Utah, International tract is similar.

Mining conditions on the lease include a predominance of fairly steep slopes, varying dips of the Williams Fork strata from 3 to 10 degrees, the presence of faults, a subsidiary folding and joint system, and alternating harding and soft beds in the overburden.

Diligence Development Analysis

The magnitude of the potentially recoverable reserves on the Utah International Danforth Hills tract, and their quality, indicate that a mine will be developed. Issues such as the company's dispute with the Interior Department over the status of a 2081.57 acre PRLA the company holds adjacent to its current lease will serve to delay development. However, it is believed that this problem can be resolved and the property in development by 1991.

#23, 24, 25

SOMERSET LEASES

U.S. STEEL COMPANY
MAP LOCATION C-15
FEDERAL COAL LEASES: C051669
C068389
D052558
GUNNISON COUNTY, COLORADO

The undeveloped leases held by U.S. Steel in Gunnison County are in near proximity to its Somerset mine. One of the leases, C051669, is located directly across the valley of the North Fork of Gunnison River. The other two leases are located several miles to the east and the south of the Somerset mine.

The leases which are to the south of the Somerset mine, C051669 and C068389, are reported to have both strippable and underground reserves. The strippable reserves are given to be 5 and 4.5 million tons and the underground reserves 11 and 2 million tons, respectively. The third lease, D052558, near the Somerset Mine has an estimated 3.5 million tons of deep reserves.

U.S. Steel has stated that it has no plans to mine these 3 leases. The coal on the leases is more suitable for steam coal than coking coal. If U.S. Steel entered the steam coal market these leases could be mined and could share processing and shipping facilities with the Somerset Mine.

Diligent Development Analysis

U.S. Steel will not mine these leases before 1986 and has no current plans to mine them at all. Unless the tracts are sublet or assigned to another operator it is unlikely that the leases will be in compliance with the diligent development regulations. The leases are noncontiguous with U.S. Steel's Somerset Mine and with each other so that they could not be incorporated into an LMU so that production from an active mine could be credited toward meeting diligence rules.

#28

COAL BASIN TRACTS

U.S. STEEL COMPANY

MAP LOCATION C-18

FEDERAL COAL LEASES: C0125485
C030334
C030336
C12638
C12639
C1894
C7852
C7853

GUNNISON COUNTY, COLORADO

The federal leases comprising the Coal Basin Tracts held by U.S. Steel contain a total of 3,469.13 acres. The leases are all co-located at an elevation of approximately 10,000 feet in high mountain valleys on the boundary between Gunnison and Pitkin Counties.

The coal seams in the Coal Basin Field are known to contain high quality metallurgical coals. Although the seams are generally quite thick, 25 to 40 feet in many places, mining is made difficult by dips in excess of 20 degrees and considerable faulting. Also, depths of cover in excess of 3000 feet for some of the deposits create very difficult mine support conditions.

Proof that the potential rewards from mining these seams outweigh the disadvantages associated with difficult mining conditions are the adjoining mines that have been developed by Mid-Continent Coke & Coal and that are being planned by Anschutz Coal Company. Both of these companies have developed innovative techniques which deal with the difficulties of thick and steeply dipping seams and of operating in a harsh mountain environment.

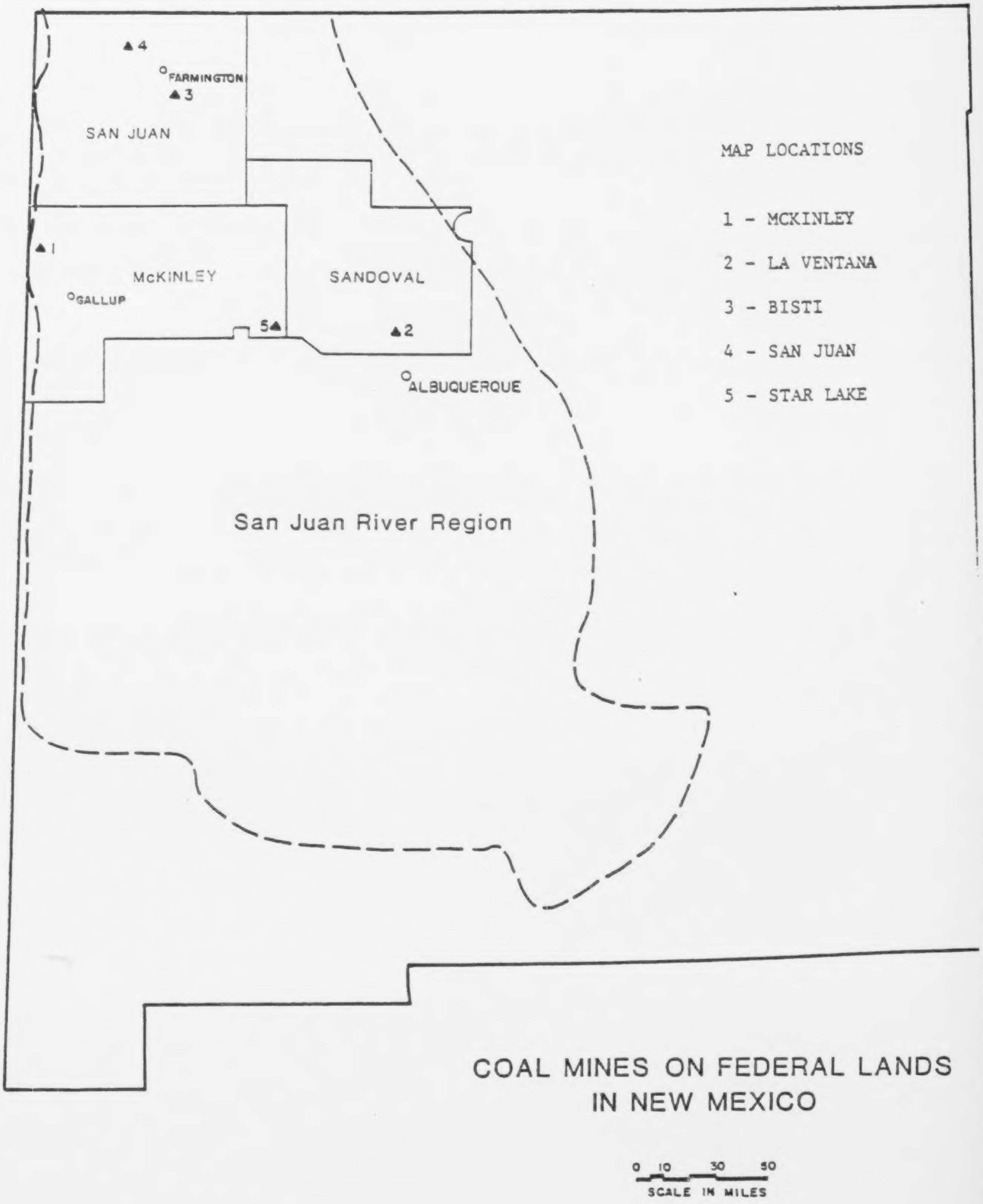
These include various novel longwall mining techniques and the use of rock tunnels for the transport of men, materials, and coal.

Diligent Development Analysis

U.S. Steel will develop its Coal Basin tracts or assign the rights to others if the market for metallurgical coal justifies. Right now and into the near future there is a glut of coking coals on the domestic and world markets. Even if the markets changed quickly, it would be difficult to have the leases in production by 1986.

U.S. Steel has no current plans to develop the Coal Basin leases before 1991. According to U.S. Steel comments:

> These leases contain medium volatile metallurgical quality coking quality coal. These reserves serve as a standby source of medium volatile coal, now being furnished by the Mid-Continent Resources Inc. mines, which is necessary for blending with the high volatile coals being mined in Somerset, Colorado and Horse Canyon, Utah.


4
FARMINGTON
3
SAN JUAN
1
McKINLEY
GALLUP
SANDOVAL
5
2
ALBUQUERQUE
San Juan River Region
MAP LOCATIONS
1 - MCKINLEY
2 - LA VENTANA
3 - BISTI
4 - SAN JUAN
5 - STAR LAKE
0 10 30 50
SCALE IN MILES

COAL MINES ON FEDERAL LANDS IN NEW MEXICO

MCKINLEY MINE
PITTSBURG AND MIDWAY COAL MINING COMPANY
MAP LOCATION NM- 1

FEDERAL COAL LEASES:	NM057348	(2,485.12 Acres)
	NM057349	(2,513.46 Acres)
	NM0554844	(540.49 Acres)
	NM065466	(2,560.00 Acres)
	THE NAVAJO TRIBE	(11,157 Acres)
	SANTE FE RAILROAD COMPANY	(7,613 Acres)

McKINLEY COUNTY, NEW MEXICO

The McKinley mine is loacted approximately 20 miles northwest of Gallup, New Mexico. The mine itself is split into the North mine and the South mine by the State Highway 264 which traverses the property in the east-west direction.

The mine plan, approved under the 211 regulations on March 22, 1979, is comprised of 6,670 acres. Surface ownership of the leased areas is distributed as follows: THE NAVAJO TRIBE, 11,157 acres; PUBLIC LANDS, 642 acres; INDIAN ALLOTTEE, 7,514 acres; and PRIVATE SURFACE, 7,613 acres.

The McKinley Coal Field is an extremely complex geologic area, the geology and stratigraphic units follow no consistent pattern throughout the mine area. The seams in the area are not always continuous and the mine area contains faults with displacements less than 100 feet. The faults trend northeast and appear to dip steeply, generally the upthrown block is to the southeast.

The McKinley mine contains five seams, four are considered to be mineable. Pittsburg and Midway (P.M.) decided to use colors for the seam names and are presented stratigraphically as follows, lowest to highest:

The Green seam, lowest economical seam occurring under most of the leased area and is the thickest along the west where the seam outcrops, the Green seam averages around seven feet thick;

The Brown seam lies between 20 to 30 feet above the Green seam and can only be economically mined if the Green seam is mined;

The Blue seam lies 40 to 50 feet above the Green seam and averages 5 feet thick over the leased area, it is only mined when the overburden to coal ratio of the Green or Fuchsia seams are economic;

The Fuschia seam is the most important seam of coal in the leased area. This seam may occur as several seams or as one thick unit, depending on its location in the lease area. It also occurs over the greatest strippable area. When mined, the Blue seam is also mined.

The Yellow seam lies 10 to 40 feet above the Fuchsia seam, this seam is usually too thin to be mined by itself and is only mined when other seams are mined.

Coal obtained from all of the seams are generally blended; a proximate analysis (as-received) is as follows:

Ash	12%
Moisture	14.5%
Sulfur	0.6%
Volatile Matter	36.2%
Fixed Carbon	36.7%
Heat Value	10,000 Btu/lb

Reserves for the LMU were estimated to be 150,000,000 tons in-place (Coal Age, April, 1978). Sixty percent of these reserves are indicated to be on the Navajo reservation.

The complex geology has dictated the development of a mining plan which employs a variety of methods. These include standard stripping, extended bench, truck and shovel, and scraper and dozer. The method utilized at any one time in a given area will depend upon such variables as coal sales, dragline availability, parting removal, weather, geology, and reclamation.

The McKinley mine, a surface operation utilizing open pit stripping, uses the dragline as a primary tool. The current operation uses the draglines to strip to a depth of 120 feet. Should greater depths be necessary, the draglines are moved to a flattened spoil pile or to a lower bench area. P.M. uses an overburden to coal ratio of 8:1 and tries to maintain this ratio. Usually the draglines are confined to areas where the overburden is greater than 20 feet.

For overburden less than 20 feet, various other methods are utilized for the overburden removal. For example, when the overburden is zero to four feet, a dozer is used to push the material into the slot left by the previous pit. From 4 to 20 feet of overburden, trucks and shovels are used to remove the overburden or parting.

The North mine has been developed as one major area with seven pits, the South mine is divided into two major areas, the East and West blocks. Three mining areas are detailed for the West block of the South mine. The West block mining plan was approved in March, 1979; this covers a five year mine Plan from 1979 to 1985. Currently a dragline is working in the West Area 2 and 2 South Area, taking only the Green seam. The mine calls for stripping to a depth of 140 feet or until the economics are unfavorable. With this depth, the mine plan calls for the use of extended bench mining technique.

Production from the McKinley mine is approximately 5,000,000 tons per year, 4,000,000 tons come from the North mine and 1,000,000 tons are produced in the South mine. Production is further defined as 1,250,000 tons from Federal leases and 3,750,000 tons from non-Federal leases.

Production in the South mine is broken into the East and West blocks as previously mentioned. The East block mining plan is currently in preparation; the actual mining is to take place from 1985 to 2013.

P.M. has reclaimed all pre-law lands disturbed by strip mining, reclamation is kept current and as close behind the active mine as possible. P.M. works on a five year plan; the first year the spoil is graded, then the land lies fallow for one year to allow undesirable materials to leach out that could prohibit plant growth; the third year seeding and grading occurs and then the area is fenced to control grazing. The area is allowed until the fifth year before the area is considered complete.

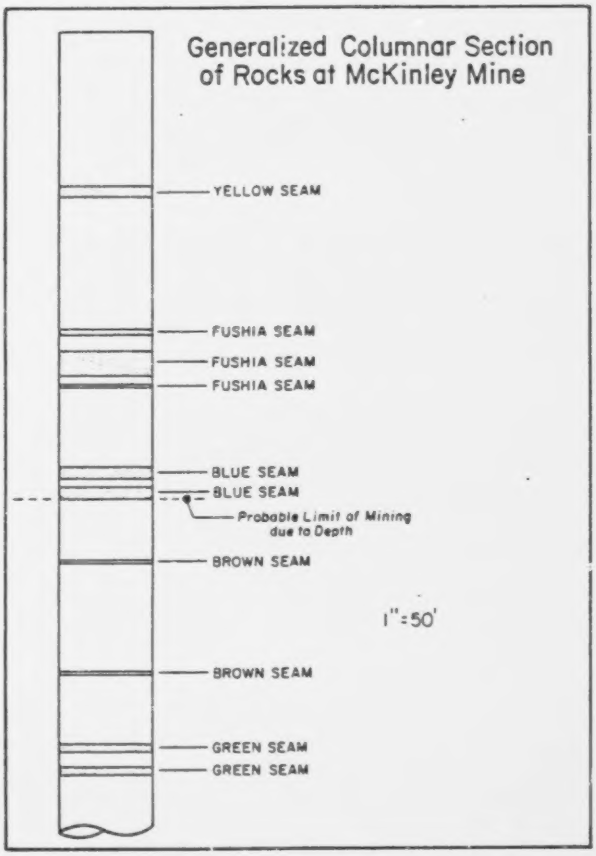

Generalized Columnar Section of Rocks at McKinley Mine
YELLOW SEAM
FUSHIA SEAM
FUSHIA SEAM
FUSHIA SEAM
BLUE SEAM
BLUE SEAM
Probable Limit of Mining due to Depth
BROWN SEAM
1"=50'
BROWN SEAM
GREEN SEAM
GREEN SEAM

Figure NM-2-1. Generalized Columnar Section of Rocks at McKinley Mine (adapted from Pittsburg and Midway Coal Company Mine Plan).

Production Capability Analysis

The McKinley mine is one of the more complex mines to be found in the western United States. In part, this is because there are 5 different seams that are mined in varied locations in the North and South mines. More importantly, the complexity of the mine plan can be attributed to the variability of the seam thicknesses, and of the amounts of overburden and interburden that overlie and separate the different seams. All of this is further complicated by the dipping of the seams to the east.

Because of the above factors, the basic mining pan at McKinley seems to be based on the use of whatever stripping method is most appropriate for a particular situation. Although the basic piece of equipment for overburden removal is the dragline, the dragline operations will be supplemented by other types of stripping equipment when necessary. For example -- to avoid the use of the extended bench method for dragline stripping and the inherent inefficiencies of rehandling the material the company will instead assign a shovel and a fleet of trucks to come in and remove enough of the overburden to allow for standard dragline stripping.

There is insufficient information available to accurately check the reported reserves for the mine.

The number of operating pits in the McKinley make it possible to support almost any production rate that is required. Movement of the mined coal to a centrally located rail loadout facility is done by trucks travelling over a well constructed main haul road that traverses the length of the LMU. Connector roads extend from the central haul road into active mine areas at 3000-foot intervals. Before the coal is loaded on to trains it is run through a coal preparation plant.

P.M. has paid special attention to the reclamation of mined out portions of the LMU. Prior to the requirements imposed as a result of the surface mining legislation the company already had implemented reclamation programs to return the land to its approximate original contours. These programs included provisions for contour plowing to impede soil erosion, seeding with a variety of native grasses, and the construction of dams for the formation of sediment ponds to prevent silted water from entering the natural drainage courses.

Diligent Development Analysis

The remaining in-place reserves of 150 million tons and an annual production rate of 5 million tons indicate a remaining mine life of 27 years if a 90 percent recovery rate is assumed. Therefore, the mine is in compliance with the requirements for diligent development and continuous operation. There is no indication that the company is seeking additional reserves at this time.

STATE: NEW MEXICO **REGION:** SAN JUAN RIVER **COUNTY:** McKINLEY

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Mc KINLEY	PITTSBURG AND MIDWAY COAL MINING CO.	NM057348 NM057349 NM0554844 NM065466	6,670	2485.12 2,513.46 540.49 2,560.00	18,770	S	APPROVED (1) 12-16-75 (2) 3-22-79	5.0 TPY ③

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 150.0

RECOVERABLE: 127.5

SOURCE: COAL AGE, 1978

ASSOCIATED LEASES WITH REASONS WHY:

All Figures Shown In Million Tons

COMMENTS: MINE SPLITS PRODUCTION (3) 4.0 TPY NORTH MINE
1.0 TPY SOUTH MINE

SOUTH MINE FURTHER SPLIT INTO EAST BLOCK & WEST BLOCKS

(1) NORTH MINE

(2) SOUTH MINE, WEST BLOCK

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: New Mexico REGION: San Juan River COUNTY: McKinley

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
McKinley	Pittsburg & Midway	4	Surf

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Green	Brown	Blue	Fuchsia	Yellow			
FORMATION	Menefee	→	→	→	→			
RANK	Sub b	→	→	→	→			
THICKNESS	7'	< 3'	5'	13.7	4-5'			
Btu/LB (1)	10000							
SULFUR (%)	0.6							
ASH (%)	12.0							
MOISTURE (%)	14.5							
FIXED CARBON (%)	36.7							
VOLATILE (%)	36.2							
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL			150.0	INDEP. Source
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL			127.5	
	SURFACE	35.06	92.44		
	UNDERGROUND				

NOTES: (1) Blended analysis for all seams

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: NEW MEXICO **REGION:** SAN JUAN RIVER **COUNTY:** MC KINLEY

MINE NAME OR LEASE BLOCK McKINLEY	LESSEE(S) PITTSBURG & MIDWAY	NUMBER OF LEASES 4	DATE MINE OPENED: 1961 PROJECTED CLOSING DATE: 2013 REMAINING MINE LIFE: 33
REMAINING RECOVERABLE RESERVES: FEDERAL: 35.06 NON-FEDERAL: 92.44		MINE DESIGN CAPACITY 5.0 RECOVERY RATE: 85	CUMULATIVE PRODUCTION TO 1979: 1979 ACTUAL PRODUCTION: 4.366

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	4.6		
1981	5.0	1.25	ARIZONA PUBLIC SERVICE
1982	↓	↓	3.0 TPY
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990	5.0	1.25	
Post 1990	50.0		

NOTES: OVERBURDEN TO COAL RATIO OF 8:1 UTILIZED, MAX STRIP DEPTH - 140 FEET.

All Figures Shown in Million Tons

PRODUCTION SUMMARY

8B, #4

LA VENTANA MINE
IDEAL BASIC INDUSTRIES
MAP LOCATION NM- 2

FEDERAL COAL LEASES: NM0510466 (2,002.06 Acres)
NM0510467 (2,432.94 Acres)
NM0510468 (2,505.47 Acres)
NM0555316 (160.00 Acres)
NM0555317 (2,206.04 Acres)

SANDOVAL COUNTY, NEW MEXICO

The La Ventana lease area is approximately five to six miles south of Cuba, New Mexico. Ideal Basic Industries purchased 10,500 acres of coal reserves from Consolidation Coal Company in November, 1977 in the northern part of the La Ventana Coal Field. After an exploration program in 1978, Ideal Basic and their new wholly-owned subsidiary IBI Coal Company prepared a permit application and mine plan for the La Ventana mine and submitted it for approval in November, 1979. Surface ownership is distributed between the Federal government and private ownership as follows: 5,546.00 acres Federal and 3,761.00 acres private surface.

The La Ventana Project occupies a small part of the San Juan Structural Basin. The geologic column of the mining area is illustrated below:

UPPER CRETACEOUS Lewis Shale
La Ventana Tongue of Cliff House Sandstone
Menefee Formation
* Allison Member (contains Padilla Coal Bed)
* Cleary Member
Point Lookout Sandstone
Mancos Shale

* Coal bearing unit

This section represents a complete regressive-transgressive cycle. The marine Mancos Shale is overlain by the beach and shallow marine Point

Lookout Sandstone. Paludal deposits of the lower part of the Cleary Member contain regressive coal beds. The upper Cleary and lower Allison units were deposited in a lower coastal plain fluvial environment. The Padilla coal bed occurs in the uppermost portion of the Allison Member. The coal is often directly overlain by marine sands of the La Ventana Sandstone Tongue. The La Ventana intertongues with and grades into the marine Lewis Shale.

Stratigraphically, the surface facility area is near the contact of the Menefee Formation and La Ventana Sandstone. The Padilla Coal bed is the highest unit of the Menefee at this location, so it directly underlies La Ventana. Both the Menefee and La Ventana crop out in the immediate vicinity of the surface facility area.

The coal in the Padilla seam in this area is mainly 8 to 10 feet thick. The dip of the Padilla and adjacent strata is around 12 degrees in a westerly direction. The depth of cover over the coal increases to 1,400 feet from the cropline on the east to the northwest corner of the permit area.

The method of mining at the La Ventana Coal mine will be underground room and pillar utilizing continuous miners. The mine will be developed on main entries, submains, and panels. The mine layout, mining methods, and technology used for the La Ventana coal mine are common in the industry. New developments, which prove applicable to the underground conditions encountered in the La Ventana coal mine and which improve recovery, safety, or production, will be applied during the life of the mine. It is not anticipated that any such improvements or modifications would substantially change the methods described in this plan.

Since the pitch of the coal seam is essentially west and northwest, the mine workings are laid out generally square with the compass points and lease boundaries. Most of the coal will be recovered in panels or sections with the entries on strike, driven 90° to the dip or pitch. Angular intersections and unusual shaped blocks are avoided with this configuration. Unusual shaped blocks of coal are harder to recover and roof control tends to be less predictable. Due to 21 percent pitch of the seam near the outcrop, the main entries are an exception to this rule. The main entries are driven at an angle across the pitch to reduce roadway grades to accommodate the material supply and mantrip equipment.

The overall layout is designed to minimize development workings and maximize production workings. In this way, mains and submains are designed for a longer life while panels are generally designed in a repetitive manner for shorter lives. Two basic design types are considered, those for complete pillar recovery and those for partial recovery.

Those sections or panels designed for total pillar recovery are designed for controlled caving and subsidence. Those sections or panels for partial recovery and development only, are designed to be stable, avoiding surface subsidence where subsidence could be detrimental.

After mining of a panel or area of the mine not needed for continued production, the USGS will be notified, and the area will then be sealed. The atmosphere of the sealed area will be monitored for oxygen, methane, and carbon monoxide. Studies of the Padilla Coal Seam shows a high spontaneous combustion potential. As a precaution, and to prevent spontaneous heating of coal in old workings, where fire control would be difficult, bleeder entries will not be used and old workings sealed.

The La Ventana mine will be developed for annual production to reach 1,500,000 tons per year. Initial development from the portals will be along the main entries at a bearing of S. 47°W. These mine entries are intended to be used for the life of the mine. Eight entries are intended: four return air courses, three intake air couses, and one isolated conveyor entry. The pitch of these entries initially is 13.5 percent, bearing S. 47°W. When these entries extend far enough west to where the dip of the Padilla seam is less than 13.5 percent, the main entries will turn due west. From the mains a set of submains will be turned north for access and development of the Padilla coal seam to the north. Submains will also be developed parallel to the outcrop to the south. These submains, driven southward, will be driven to the lease boundary and then a set of submain slopes will be driven down dip to connect with another future set of submains driven southward from the main slopes.

Along with initial development, panels will be developed for production. However, in the initial years, development of mains and submains will be required to allow areas for additional mining units. Development of mains and submains will continue throughout the life of the La Ventana mine.

Within a single planel, mining will cycle on a daily basis. The continuous miners will mine one cut approximately 18 feet by 20 feet. Two shuttle cars will alternately load-haul and unload approximately six to eight tons.

When the continuous miner has completely mined one cut, the continuous miner will move to the next place (cut) sequenced to be mined. After the continuous miner moves out of the cut, the place is temporarily supported on timber or jacks, if required. The roof bolter moves into the place and begins roof bolting until the mining cut is completely roof bolted. As the cut is bolted, the ventilation curtain (brattice) or vent tubing is permanently advanced to the face. After the roof bolter moves out, the scoop (load-haul-dump) pushes all loose coal to the face. After cleaning, the cut is rock dusted, and the area is ready for the continuous miner to mine the next cut. This mining cycle is typical with some variation in the number of areas mined simultaneously, and the order in which areas are mined. With a single split of air, one return, the cycle varies to keep roof bolters from exposure to respirable dust. With a single split, travel curtains are used to allow shuttle cars through the ventilation curtain. A double split of air, two returns, requires no travel curtains.

| The mining techniques and portal locations have been selected to prevent significant changes in the existing ground-water regime. The alluvium along the Rio Puerco and its major tributaries represents the most significant aquifer in the area. Only controlled extraction will be used in mining beneath the alluvium to prevent any subsidence which might disrupt the aquifer. In addition, the portals have been located about 200 feet above the piezometric surface in the coal seam and adjacent zones, which will prevent gravity drainage of mine water. The mine has been designed to minimize adverse effects on there water users' water supplies.//

IBI plans to use some water from the Rio Puerco alluvial aquifer for potable water and dust suppression. It is expected that only minimal interference at the nearest well of another user will be caused by this withdrawal of groundwater.//

A BLM owned well is the only known well to draw water from the coal seam and adjacent zones. Dewatering of the mine may diminish the quality of quantity of water available to that well. If either is diminished, IBI Coal Company will provide an alternate source of water to the BLM.//

IBI Coal Company is making provisions to secure, either by allocation, or purchase and transfer adequate water rights for the consumptive use of ground water at the La Ventana project.//

| Production from the La Ventana mine is to be utilized in a cement plant east of Albuquerque, New Mexico. Ideal Basic also plans to sell some of their coal on the spot market as industrial-steam coal.//

Inherent in the construction and operation of the La Ventana Mine, will be efforts to ensure the protection of the environment. IBI Coal Company will establish meausres to avoid, reduce, or control adversities on physical and living companents of the environment, as well as human values.//

*Spare Mining Unit

TABLE II-5

PRODUCTION SCHEDULE

Year	Work Days Per Year	Unit Shifts Per Year	MINING UNITS PER YEAR New	MINING UNITS PER YEAR Repl.	MINING UNITS CUMULATIVE Oper.	MINING UNITS CUMULATIVE Total	AVERAGE TONS PER DAY	AVERAGE TONS PER UNIT SHIFT	TOTAL TONS PER YEAR (000's)	TOTAL TONS CUM. (000's)
1	240	480	1		1	1	450	225	108	108
2	240	960	1		2	2	1220	305	293	401
3	240	1440	1		3	3	2010	335	482	883
4	240	1440	1*		3	4	2370	395	569	1452
5	240	1920	1		4	5	3400	425	816	2268
6	240	2400	1		5	6	4458	446	1070	3338
7	240	2880	1		6	7	5350	446	1284	4622
8	240	3360	1	1	7	9	6250	446	1500	6122
9	240	3360		1	7	10	6250	446	1500	7622
10	240	3360		1	7	11	6250	446	1500	9122
11	240	3360		1	7	12	6250	446	1500	10,622
12	240	3360		1	7	13	6250	446	1500	12,122
13	240	3360		1	7	14	6250	446	1500	13,622
14	240	3360		1	7	15	6250	446	1500	15,122
15	240	3360		2	7	17	6250	446	1500	16,622
16	240	3360		1	7	18	6250	446	1500	18,122
17	240	3360		1	7	19	6250	446	1500	19,622
18	240	3360		1	7	20	6250	446	1500	21,122
19	240	3360		1	7	21	6250	446	1500	22,622
20	240	3360		1	7	22	6250	446	1500	24,122
21	240	3360		1	7	23	6250	446	1500	25,622
22	240	3360		2	7	25	6250	446	1500	27,122
23	240	3360		1	7	26	6250	446	1500	28,622
24	240	3360		1	7	27	6250	446	1500	30,122
25	240	3360		1	7	28	6250	446	1500	31,622
26	240	3360		1	7	29	6250	446	1500	33,122
27	240	3360		1	7	30	6250	446	1500	34,622
28	240	3360		1	7	31	6250	446	1500	36,122
29	240	3360		2	7	33	6250	446	1500	37,622
30	240	3360		1	7	34	6250	446	1500	39,122
31	240	3360		1	7	35	6250	446	1500	40,622
32	240	3360		0	7	35	6250	446	1500	42,122
33	240	2516		0	6	35	4675	446	1123	43,244
34	240	1287		0	4	35	2392	446	574	43,818
35	114	229		0	1	35	892	446	102	43,920

LAVENTANA

TABLE I

RESERVES AND QUALITY SUMMARY
PADILLA COAL BED*
LA VENTANA PROJECT, SANDOVAL COUNTY, NEW MEXICO

LEASE NUMBER	ACRES LEASED	COAL ACRES	AVERAGE COAL THICKNESS	TONS IN PLACE (000)	TONS RECOVERABLE (000)	AVERAGE MOISTURE %	AVERAGE ASH %	AVERAGE SULFUR %	AVERAGE VOLATILE MATTER %	AVERAGE BTU./LB.	AVERAGE ASH-FUSION TEMP. (F°)
NM0510468	2505	848.6	8.08	12,129.8	6064.9	15.07	7.21	1.73	34.8	10735	2044.1
NM0510467	2433	1350.5	6.69	15,994.2	7997.1	14.47	8.89	2.27	34.0	10529	2029.2
NM0510466	1998	1375.1	9.05	22,025.4	11,012.7	15.95	9.69	1.92	33.9	10411	2084.9
NM0555316	160	160.0	10.09	2858.0	1429.0	15.42	6.65	1.83	35.1	10647	1984.2
NM0555317	2206	1836.2	9.57	31,113.0	15,556.5	16.77	8.13	1.41	33.6	10190	2178.2
M19167	640	14.4	9.65	246.0	123.0	22.21	6.18	1.19	31.7	8930	2071.5
M19320	555	--	--	--	--	--	--	--	--	--	--
TOTALS/ AVERAGES	10497	5584.8	8.53	84,366.4	42,183.2	15.85	8.46	1.76	34.0	10406	2097.6

*Greater than 100' Cover - 5' Thickness Cut-off
Assumes 1770 tons/acre-foot; recovery factor 0.5

Production Capability Analysis

The La Ventana mine is designed as a standard room and pillar operation using continuous miners for coal extraction. With the exception of a 12-degree dip in the coal seam, mining conditions at La Ventana appear to be quite favorable. The coal seam ranges from 8 to 10 feet in thickness and is present over the entire property. There is a reasonably competent sandstone to form the roof rock, so support problems should be minimized. The planned mining area appears to be dry.

As described earlier in this narrative, mining will advance down dip to the west. The planned production rate of 1.5 million tons per year is based on 240 operating days per year and 14 continuous miner shift per operating day. This equates to a relatively conservative 446 tons per continuous miner shift.

The planned recovery rate is 50 percent. Considering the very favorable mining conditions and a maximum depth of cover of 1400 feet, there is a good possibility that this percentage will be exceeded when mining actually begins. In fact, from the information available it appears that a longwall operation would be quite feasible for this property. Longwall would boost the overall recovery rate to 70 or 80 percent.

Potential environmental impact will be minimal. Other than a small amount of surface subsidence, land disturbance will be limited to that required for the construction of mine support buildings and a preparation plant. This land is scheduled for reclamation after mining operations are completed.

Diligent Development Analysis

Considering that Ideal Basic has the captive markets for the coal and the access to the investment capital that will be required for mine development, there is every indication that the company will have the La Ventana mine in production by 1986. The quality of the reserves should be entirely adequate to support the planned 35-year life of the operation. It is therefore expected that La Ventana will be in full compliance with the requirements for diligent development and continuous operation.

STATE: New Mexico **REGION:** San Juan River **COUNTY:** Sandoval

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
La Ventana	Ideal Basic Industries	NM0510466	5584	2002.06	1195	U/G Room & Pillar	Submitted M.P.	3.0 TPY
		NM0510467		2432.94				
		NM0510468		2505.47				
		NM0555316		160.0				
		NM0555317		2206.04				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 42.1832

SOURCE: Mine Plan

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: New Mexico REGION: San Juan River COUNTY: SANDOVAL

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
LA VENTANA	IDEAL BASIC	5	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	PADILLA							
FORMATION								
RANK								
THICKNESS (1)	8.53							
Btu/LB	10,406							
SULFUR (%)	1.76							
ASH (%)	8.46							
MOISTURE (%)	15.85							
FIXED CARBON (%)	53.74							
VOLATILE (%)	34.00							
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND	84.1264	0.246	84.3664	MINE PLAN
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND	42.0602	0.123	42.1832	"

NOTES: (1) TOTAL AVERAGE for ALL LEASES

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: NEW MEXICO **REGION:** SAN JUAN RIVER **COUNTY:** SANDOVAL

MINE NAME OR LEASE BLOCK: LA VENTANA

LESSEE(S): IDEAL BASIC

NUMBER OF LEASES: 5

DATE MINE OPENED: 1981

PROJECTED CLOSING DATE: 2016

REMAINING MINE LIFE: 35

REMAINING RECOVERABLE RESERVES:

FEDERAL: 42.0602

NON-FEDERAL: 0.123

MINE DESIGN CAPACITY 3.0

RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981	0.108		
1982	0.293		
1983	0.482		
1984	0.569		
1985	0.816		
1986	1.070		
1987	1.284		
1988	1.50		
1989	1.50		
1990	1.50		
Post 1990	34.798		

NOTES:

All Figures Shown In Million Tons

PRODUCTION SUMMARY

5B, #4

BISTI MINE
WESTERN COAL COMPANY
MAP LOCATION NM- 3

FEDERAL COAL LEASES:	NM0186612	(2,188.62 Acres)
	NM0186613	(1,240.00 Acres)
	NM0186615	(2,027.16 Acres)

SAN JUAN COUNTY, NEW MEXICO

Western Coal Company is a wholly owned subsidiary of Public Service Company of New Mexico and Tucson Gas and Electric Company. Western Coal Company is also the operator of the present San Juan Surface Mine near Farmington, New Mexico.

The area to be mined during the lifespan of the Bisti mine includes 4,253.63 acres of Federal lands, 320.00 acres of State land, and 1,202.15 acres of Indian Allotment land. Responsibility for the surface and subsurface Indian Allotment land are shared by the Bureau of Indian Affairs and the Navajo Tribe. No private fee lands are involved.

The Bisti mine is southeast of Farmington, New Mexico, and northeast of Gallup, New Mexico. The area is known as the Star Lake, Bisti area within the San Juan Basin.

The rationale for the Bisti mine lies predominately in the soils of coal to the New Mexico Generating Station. Until this station enters into production, however, the Bisti mine will ship its coal to the San Juan mine. Initial production and production until the startup of the New Mexico Generating Station will be approximately 250,000 tons per year. This nominal amount of production will be shipped out via small haulage trucks over existing highways.

Development of the Bisti mine will begin along the shallowest side of the deposit. The mining will incorporate cut and fill practices using pits approximately 100 feet in width. As production increases, the mine will be developed to include drag-line operations. The expected mining sequence is as follows:

1. Clear and level area to be mined. (Dozers)
2. Remove and stockpile suitable surface material. (Scrapers)
3. Drill overburden. (Rotary Drill)
4. Load and blast overburden. (ANFO Bulk Loading Truck)
5. Remove overburden to top of coal seam (Dragline)
6. Drill coal. (Coal Auger)
7. Load and blast coal. (ANFO Bulk Loading Truck)
8. Mine and haul coal. (Shovel or Front-end Loader and Trucks)
9. Deposit power plant waste products in bottom of pit or in spoil "vees". (Trucks)
10. Begin the next cycle.
11. Spoil grading and reclamation parallel this cycle, and lag by approximately three pits.

Based on 199 drill holes throughout the lease area, Western Coal Company has estimated that there are 87,128,000 tons of recoverable reserves. The total overburden is estimated to be 493,713,000 cubic yards, giving the mine an average stripping ratio of 5.7:1. Based on a 20-year mine life, an average of 4,356,400 tons of coal will have to be mined annually.

A proximate analysis for coal sample taken throughout the mine area, is as follows:

COAL ANALYSIS

	As Received (Raw)	
Proximate Analysis	Typical	Range
Moisture %	16.7	11.0 - 23.03
Ash %	19.6	8.33 - 30.35
Volatile %	29.6	23.85 - 39.81
Fixed Carbon %	34.1	26.76 - 41.80
Sulfur %	0.54	0.30 - 0.74
Btu/lb (as received)	8,300	6,870 - 10,564

It is estimated that the dragline mining method will yield a 90 percent recovery rate. All coal seams over 3 feet in thickness will be recovered down to a maximum pit depth of 160 feet. Most of the Bisti mine will be run as a single seam operation, but as many as three seams will be mined where present.

Reclamation will be concurrent with these activities. A portion of the truck mine area will become the final mine plant site location. This area will be leveled and compacted furing the truck mine sequence, but will not be seeded.

Production Capability Analysis

The quality and the quantity of the reserves available on the proposed Bisti mine together with a very favorable stripping ratio of 5.7 to 1 indicate that this property definitely has the potential to become a successful mining operation. This type of deposit is highly amenable to recovery by the dragline strip mining method proposed by the company.

The potential environmental impact will be that expected of any strip mining operation. Techniques for the successful grading and shaping of the spoils are well developed. The question as to whether the reclaimed land can be properly revegetated in this arid, desert environment remains unanswerable at this time.

Transportation of the 4.3 million tons of coal to the proposed New Mexico Generating Station, if that in fact is ultimately the destination, is something that still has to be provided for. It is assumed, however, that if the operation of the Bisti mine is approved, then the required transportation link will be developed.

Diligent Development Analysis

The major issue opposing the approval of the Bisti mine plan is the question of land use. If this question is resolved in favor of allowing mining to proceed, then there is every indication that the property can be successfully mined. Assuming that the land use problem will be resolved in the next 2 to 3 years, then it is quite likely the Bisti mine will be in operation by 1986 and in compliance with the requirements for diligent development and continuous operation.

STATE: New Mexico **REGION:** SAN JUAN River **COUNTY:** San Juan

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Bisti Mine	Western Coal Co.	NMO 186612 NMO 186613 NMO 186615	5775.78	2,188.62 1,240.00 2,027.16 5455.78	1522.15	Open Pit	SUBMITTED M.P.	4.3564

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 87.128

SOURCE: Mine Plan

ASSOCIATED LEASES WITH REASONS WHY:

All Figures Shown in Million Tons

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: New Mexico REGION: San Juan River COUNTY: San Juan

MINE NAME (OR LEASE BLOCK): Bisti Mine

LESSEE(S) (OR OPERATOR): Western Coal Co.

NUMBER OF LEASES IN BLOCK OR PLAN: 3

MINING METHOD: Open Pit

COAL CHARACTERISTICS: ①	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME								
FORMATION								
RANK								
THICKNESS								
Btu/LB	8,300							
SULFUR (%)	0.54							
ASH (%)	19.6							
MOISTURE (%)	16.7							
FIXED CARBON (%)	34.1							
VOLATILE (%)	29.6							
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL			87.128	M.P.
	SURFACE				
	UNDERGROUND				

NOTES: ① Typical

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: New Mexico **REGION:** San Juan River **COUNTY:** San Juan

MINE NAME OR LEASE BLOCK: Bisti Mine

LESSEE(S): Western Coal Co.

NUMBER OF LEASES: 3

DATE MINE OPENED: 1982

PROJECTED CLOSING DATE: 2116

REMAINING MINE LIFE: 34

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY

RECOVERY RATE: 90

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982	0.12		
1983	0.25		
1984	1.0		
1985	2.0		
1986	2.5		
1987			
1988	↓		
1989			
1990	2.5		
Post 1990	73.758		

NOTES:

All Figures Shown In Million Tons

PRODUCTION SUMMARY

1A, #1

SAN JUAN MINE
WESTERN COAL COMPANY
MAP LOCATION NM-4
FEDERAL COAL LEASES: NM045196 (2467.24 acres)
NM0455197(2565.60 acres)
NM043217 (1800.00 acres)
SAN JUAN COUNTY, NEW MEXICO

The San Juan Mine is located approximately 12 miles west of Farmington, New Mexico. Access to the mine is gained by the County Road 61 on the southeast portion of the lease area, this road intersects with Federal Route 550.

The LMU is made up of three Federal leases that contain an estimated 60 million strippable tons lying within the 6,852.84 leased acres. The BLM administers Federal mineral rights on 6,832.84 acres and the State of New Mexico administers mineral rights on another 120 acres. Surface rights on about one-third of the Federal mineral rights lands are privately owned; the other two-thirds are Federally controlled. It is possible that the mine may be expanded to include Ute Indian Reservation lands and fee lands which adjoin the present LMU boundaries.

The coal is found in the Fruitland Formation interbedded with shales and coal layers of varying thicknesses. The coal-bearing rocks outcrop at the west edge of the leased area and dip to the east at about 1-1/2 to 3 degrees. One coal seam is being surface mined, the lower seam it varies in thickness from 8 to 12 feet and averages 15 feet.

Development drilling and engineering studies have determined the gross outline of the coal deposit which is economically mineable by surface methods. The up-dip (western) limits of the estimated mine area are predicted on a heat-value limitation of approximately 9,000 Btu/lb. The southern and eastern (down-dip) limits of the mine area are predicted on physical constraints, such as bluffs, high hills, and overburden/coal ratios. The thin coal area separating the northern and southern mining areas is excluded on the basis of uneconomically high stripping ratios.

A relatively thin coal seam exists in the eastern portion of the projected mine area. It is anticipated that where this bed is encountered during the stripping of the principal coal bed, it will be mined by the dragline and delivered to the station if the recovered coal is of an acceptable grade.

Western plans to continue mining along the Lower Seam until the economics of the overburden ratio halts the process. At that point, Western plans to slope and bench the highwall to stabilize the strata and create a portal to continue the mining of the lower seam underground. Western has leased the Federal land to the east under Competitive Lease Number NM28093, (3,855 acres) to allow the mine to proceed as an underground operation. The overburden above the lower seam will range from 325 feet in the west to 700 feet in the eastern boundary.

An analysis of the coal obtained from the strippable seam in the San Juan mine is given in the following table. The predicted average sulfur and ash contents are 0.8 and 18 percent, respectively, with a predicted average heating value of 9,500 Btu/lb.

Coal - San Juan Mine

Coal (as received)	High Value	Low Value	Predicted Average
Heating Value Btu/lb	11,628	8,000	9,800
Moisture %	15.01	8.20	10.28
Carbon %	59.19	52.16	55.69
Sulfur %	1.30	.59	.80
Ash	22.45	12.59	18.00

This analysis gives the coal a rank of subbituminous C to subbituminous B.

Outlined below are the mining procedures at the San Juan Mine; however, unanticipated conditions or advancing technology may indicate some deviation from these practices in the future. Any significant deviation will be subject to the State of New Mexico, U.S. Geological Survey, and Bureau of Land Management approval.

Topsoil Removal: Topsoil is removed by a scraper prior to overburden removal. The topsoil is segregated from the overburden and replaced on the graded spoils before revegetation procedures begin.

Overburden Removal: Normally the rock overlying the coal bed is drilled and blasted before removal. Blasting operations are conducted in such a manner as to negate any possibility of damage to structures existing outside the mine lease. Rotary drills are employed to drill the blast holes, and a mixture of ammonium nitrate and fuel oil is used as the principal blasting agent.

Once the overburden has been loosened by blasting, it is removed from the coal seams by dragline; one electrical dragline with a bucket capacity of 55 cubic yards is used for stripping.

Coal Removal: The exposed coal seam is drilled and blasted in the same manner as the overburden prior to loading. To ensure against spontaneous combustion of the exposed coal, blasting operations are conducted only slightly prior to loading.

One or two large rubber-tired, front-end loaders are used for coal loading. The mobility of this equipment allows the mining of different coal faces on successive shifts to assure an acceptable overall quality of the delivered coal.

Hauling of coal from the pit to the mine dump hopper is by truck. Truck haulage ramps enter the pits on approximately 2,000-foot centers. Once a pit is mined to such a depth that the dragline must be positioned on the spoils side of the pit, truck haulage ramps would be fewer because of the potential spoils room occupied by these deep ramps; thus, in mining deep overburden, possible a single access ramp would enter each pit either positioned at one end of the pit or oriented diagonally down the spoils pile face.

As an adjunct to mining the coal, fly ash and bottom ash from the station are hauled back to the mine by truck and deposited in one of two alternative locations: (a) into active mining pits after the coal is mined but before the spoil from the adjacent cut is deposited, or (b) into the trough areas between the rows of spoils piles. In either event, the ash is covered by spoils to a minimum of three feet either by the stripping equipment in the case of alternative (a) or by bulldozer or front-end loader in the case of alternative (b).

Reclamation

Reclamation of the spoils at the mine is conducted concurrently with the mining operations, in compliance with the reclamation provisions called for under the provisions of the Federal or State mining leases in which the mining operations are situated. All applicable Federal, State, or local ordinances will be complied with.

To date, development drilling and engineering studies have determined the gross outline of the coal deposit which is economically mineable by surface methods. Additional drilling and actual mining operations very probably will dictate some change in the ultimate mine outline.

The up-dip (western) limits of the estimated mine area are predicated on a heat-value limitation of around 9,000 Btu/lb. The southern and eastern (down-dip) limits of the mine area are predicated on physical constraints such as bluffs, high hills, and minimum mine pit lengths. The thin coal area separating the northern and southern mining areas is excluded on the basis of uneconomically high stripping ratios.

When the eastern reach of the surface mine is attained the overburden is expected to be about 150 feet, it is here that Western plans to place the portal for the underground mine. Also to be mined by underground methods is the Upper seam, located 100 feet above the Lower seam. The Upper seam is about 5 feet in thickness and has reserves of approximately 42,987,000 tons.

The proposed San Juan Underground mine is planned as an extension from the present surface coal mining operation to recover these coal reserves that are not planned for recovery by surface mining methods.

A completed highwall of the surface mine will provide the area necessary for access to the underground mine portal. This highwall excavation will be approximately 150 feet deep. The highwall will be sloped and benched as necessary to stabilize the strata overlying the basal Fruitland No. 8 coal seam.

The Fruitland No. 8 seam in the vicinity of the portal is approximately 14 feet in thickness. To insure ground stability, the full seam will be mined during initial development for a distance of 15 feet or more from the portal. This distance will be extended if the coal is badly fractured in the portal zone. Steel sets will be installed in the portal openings to a depth of about 100 feet.

Two coal seams are encountered within the proposed underground mine plan area. The coal to be mined is contained in the basal Fruitland No. 8 Coal Seam which is typically 15 feet thick. The Fruitland No. 9 Coal Seam rides above the No. 8 seam at a height of from 95 to 125 feet and averages about 5 feet in thickness.

Initial underground room and pillar development will begin with five main headings driven southeast from the face into the highwall. A sixth entry will be branched off from the original five headings after advancement of approximately 100 feet underground. This system of 6 parallel entries bearing southeast on 75-foot centers will comprise the main entry system of the San Juan Underground Mine. Each entry will be 18 feet wide and 12 feet high. Cross-cuts will be driven on 100-foot centers. At these spacings a 57-foot wide, 82-foot long pillar will remain between main entries.

The design of all pillars in the proposed underground mine was based on eliminating subsidence and minimizing disturbance of the overlying strata including the Fruitland No. 9 coal seam which is located 95 to 125 feet above the basal Fruitland No. 8 seam.

The continuous miner will cut the in-place coal and load it into diesel powered face haulage units. The haulage units will transport the coal to a discharge station for transfer onto the underground belt conveyor for movement out of the mine. Coal handling conveyor belts of 36-inch and 48-inch widths will carry all coal mined to the surface and beyond to the stockpile-reclaim area.

The San Juan mine is a strip mining operation which extracts coal exclusively for the San Juan Power Plant at San Juan, New Mexico, 12 miles north of Farmington.

The power plant ot which the mine supplies fuel is owned in equal shares by Public Service Company of New Mexico and Tucson Gas and Electric Company. The San Juan mine is owned by Western Coal Company, a wholly-owned subisdiary of Public Service Company of New Mexico and Tucson Gas & Oil, and is mined under contract by Utah International Incorporated. Western Coal Company has an option in its mining agreement with Utah International which gives Western Coal Company the ability to contract with Utah International to furnish coal from Utah International's Navajo mine located approximately 17 miles south of the San Juan plant.

The operational life of the San Juan Generating Station is expected to span a period from 1973 to 2015. The individual plant in-service lives are expected to be as follows:

TABLE I-2

PAST AND PROJECTED PRODUCTION FOR THE SAN JUAN SURFACE AND DEEP MINE AND PROJECTED FUEL REQUIREMENTS FOR THE SAN JUAN GENERATING STATION 1/

Year	San Juan Surface Mine x 10^3 Tons	San Juan Deep Mine		Generating 2/ Station Requirement x 10^3 Tons
		Existing Lease x 10^3 Tons	Proposed Lease x 10^3 Tons	
1973-1979	9,873 3/	-	-	9,653
1979 4/	2,600			2,600
1980	2,000	284		4,327
1981	2,000	352		5,073
1982	2,000	541	135	6,345
1983	2,000	836	836	6,471
1984	2,000	500	1,500	6,471
1985	2,000	500	1,500	6,471
1986	1,800	500	1,500	6,492
1987	1,800	500	1,500	6,492
1988	1,800	500	1,500	6,492
1989	1,800		2,000	6,492
1990	1,800		2,000	6,411
1991	1,800		2,000	6,411
1992	1,800		2,000	6,329
1993	1,800		2,000	6,246
1994	1,800		2,000	6,246
1995	1,800		2,000	5,999
1996	1,800		2,000	5,873
1997	1,800		2,000	5,873
1998	1,500		2,000	5,484
1999	1,500		2,000	5,321
2000	1,500		2,000	5,195
2001	1,500		2,000	4,943
2002	1,500		2,000	4,775
2003	1,500		2,000	4,523
2004	1,500		2,000	4,523
2005	1,500		2,000	4,271
2006	1,500		2,000	4,271
2007	1,500		2,000	4,018
2008	1,100		2,000	4,060
2009	1,100		2,000	4,060
2010	1,100		2,000	4,060
2011	1,100		2,000	4,060
2012	1,100		2,000	4,060
2013	1,100		2,000	4,060
2014	1,100		2,000	4,060
2015	483		2,000	4,125
	69,256 5/	4,513 6/	62,471 7/	203,636

1/ The estimated recoverable reserves in the San Juan surface and deep mines do not fill the projected requirements of the generating station. Additional coal will be required from an unknown source.

2/ Projected requirements from U.S. Dept. of Interior, Bureau of Reclamation, 1977.

3/ Figure represents actual production through April 1979.

4/ These values and values for future years are projected for whole years.

5/ The total recoverable reserves in the surface mine are estimated to be 66,714 x 10^3 tons. Actual annual production will depend on the amount recovered from the deep mine (existing and proposed lease if Western is the successful bidder) and amount of coal transported in from an unknown source.

6/ Total estimated recoverable reserves in the deep mine (existing lease) range from 14 x 10^6 tons to 21 x 10^6 tons depending on number of seams mined and mining methods employed. Annual mining rates after 1988 are not known at the present time.

7/ Total estimated recoverable reserves in the deep mine (proposed lease) range from 50 x 10^6 tons to 70 x 10^6 tons depending on number of seams mined and mining methods employed. Annual mining rates shown are projections.

Unit #2 - 42 years (1973-2015)

Unit #1 - 39 years (1976-2015)

Unit #3 - 37 years (1979-2015)

Unit #4 - 35 years (1982-2015).

Coal demand will be supplied from both the San Juan and Navajo Coal mines. As estimated 66,714,000 tons will be stripped from 2,860 acres of Federally leased lands, or 42 percent of the existing LMU's surface area. The remaining land is unmineable due to high stripping ratios and/or inferior coal quality.

The following table (from the Environmental Assessment of the CLA NM28093) gives past and expected tonnage of Federal coal mined through the San Juan mine and the requirements of the generating station.

The Navajo mine will supply an additional 137,000,000 tons of coal over a 39-year period ending in 2015. The Navajo mine is located south of the existing power plant and on the Navajo Reservation of the Four Corners area. A total of 203,636,000 tons of coal will be burned by the plant over its 42-year life span.

Federal lease SF071448 (40 acres) was not contiguous with the mine plan. According to the surface and coal ownership status map supplied in the EA for the CLA NM28093, the lease SF071448 is bordered on three sides with Fee coal and would now be contiguous with the mine plan. The coal seam to be mined on this lease is the Carbon seam, not the Lower seam and this may be why it was not included in the mine plan.

Production Capability Analysis

The San Juan mine of the Western Coal Company is currently operating as a relatively standard design dragline strip mine. The coal is uncovered with a 55 cubic-yard dragline that will strip to depths of up to 150 feet before the surface mine is terminated at its eastern extremity. The dip of the coal seam varies from 1 1/2 to 3 degrees, so it is of relatively little concern in mine planning.

The stripped coal is mined using front-end loaders and trucked directly to the San Juan power plant. Current projections are that all of the coal mined in the San Juan surface mine, an estimated remaining 60 million tons, will be consumed by the power plant.

Because of the simplicity of the San Juan surface operations, there are no projected production difficulties during the remaining 35 years of mine life. The current annual production of 2 million tons will gradually diminish to a rate of 1.1 million tons in the closing years of the mine life. Although part of the lost production will be made up by the San Juan underground mine production, the annual fuel requirements will increasingly have to be made up from outside sources.

Western Coal is currently reclaiming all of the disturbed land as it is released from mining operations. Also fly ash is being hauled from the power plant and placed in the cuts where the coal has been mined out or in the troughs between the spoil piles. The material is buried at least 3 feet below the topsoil layer during final grading.

A corridor will be excavated to the east in advance of surface mining activities to provide access to a portal for an underground mine where the strippable overburden reaches the assigned limit of 150 feet. Underground mine development will then proceed in time to allow for the opening of an underground operation in 1982. The underground mine will have an initial production rate of 135,000 tons per year and will gradually be expanded until it achieves its maximum production capability of 2 million tons per year in 1989. It will then continue at that rate until reserves are depleted in 2015.

The underground mine has been designed as a standard room and pillar operation using continuous miners for coal extraction. Panels will be designed using 6 entries on 75-foot centers. Crosscuts will be cut on 100-foot centers. The mining width will be 18 feet so the panel recovery rate will be approximately 38 percent on advance. Because of the shallow depth of cover, it increases from 150 feet at the portal to 325 feet at the eastern boundary of the LMU, it will be possible to minimize the final pillar size without risking collapse followed by subsidence. It is estimated that the overall recovery rate for the mine will be approximately 60 percent.

Total recoverable reserves over the life of the San Juan underground mine are estimated to be 67 million tons. All of this coal will be transported to the San Juan power plant by overland conveyor.

Surface environmental impact will be minimal. Mine support buildings will be located directly outside the portal. All of this area will be reclaimed when mining operations are completed.

Diligent Development Analysis

Both surface and subsurface operations are scheduled for shutdown in the year 2015. Hence, the mines are currently in compliance with the requirements for diligent development and continuous operation.

STATE: New Mexico **REGION:** San Juan River **COUNTY:** San Juan

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
San Juan	Western Coal	NM045196		2467.24			Approved	
	Company	NM045197		2565.60	120.0	S./	12-23-71	5.5 TPY
		NM045217	6952.84	1800.00		U/G		

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 136.24 (1)

SOURCE: MINE PLAN

All Figures Shown In Million Tons

ASSOCIATED LEASES WITH REASONS WHY: NM28093 (3,855 Acres) TO ALLOW MINING TO CONTINUE UNDERGROUND.

COMMENTS: (1) INCLUDES SURFACE AND U/G RECOVERABLE

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: New Mexico REGION: San Juan River COUNTY: San Juan

MINE NAME (OR LEASE BLOCK): San Juan

LESSEE(S) (OR OPERATOR): Western Coal Co.

NUMBER OF LEASES IN BLOCK OR PLAN: 3

MINING METHOD: S – U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2 (2)	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	LOWER	UPPER						
FORMATION	FRUITLAND	→						
RANK	Sub b C-B							
THICKNESS (1)	8-20'	5						
Btu/LB	9,800							
SULFUR (%)	0.8							
ASH (%)	18.0							
MOISTURE (%)	10.8							
FIXED CARBON (%)	55.69							
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES		42.987						
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL			69.256	MINE PLAN
	SURFACE			66.984	
	UNDERGROUND				

NOTES: (1) AVERAGE
(2) TO BE MINED BY UNDERGROUND METHODS.

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: New Mexico **REGION:** San Juan River **COUNTY:** San Juan

MINE NAME OR LEASE BLOCK: San Juan

LESSEE(S): Western Coal Co

NUMBER OF LEASES: 3

DATE MINE OPENED: 1973

PROJECTED CLOSING DATE: 2015

REMAINING MINE LIFE: 35

REMAINING RECOVERABLE RESERVES:

FEDERAL: 66.714

NON-FEDERAL:

MINE DESIGN CAPACITY 5.5

RECOVERY RATE: 90

CUMULATIVE PRODUCTION TO 1979: 12.473

1979 ACTUAL PRODUCTION: 3.258

MINE PLAN PROJECTED PRODUCTION BY YEAR:	SURF	U/G EXISTING	U/G PROPOSED	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	2.0	.384				
1981		.352				San Juan Generating Station
1982		.541	.135			
1983		.836	.836			
1984		.500	1.500			
1985	2.0					
1986	1.8					
1987						
1988		.500	1.50			
1989			2.0			
1990	1.8		2.0			
Post 1990	35.723		50.0			

NOTES: Production to start underground 1980.

All Figures Shown in Million Tons

PRODUCTION SUMMARY

STAR LAKE MINE
CHACO ENERGY COMPANY
MAP LOCATION: NM-5
FEDERAL COAL LEASE: NM2457 (6336.12 ACRES)
McKINLEY COUNTY, NEW MEXICO

The proposed Star Lake Mine is located in McKinley County, New Mexico, approximately 50 miles southwest of Cuba, New Mexico.

Chaco Energy Company, a New Mexico corporation and wholly-owned subsidiary of Texas Utilities Company, intends to construct and operate a surface coal mine. Coal extracted from this operation is to be sold under negotiated spot and contract sales.

The proposed mine plan encompases 18,200 acres of Federal state, Indian and private surface. The coal ownership is under Federal, state, and private ownership. There are 7 preference right lease applications covering nearly 12,000 acres included in the proposed mine plan. Development of these reserves would only occur if the PRLA's are granted. Attaining full production capacity of 8 million tons per year is contingent on the availability of these PRLA reserves. The mine plan permit area only covers the existing federal lease and the state and fee lands. The mine is a new mine and will not be associated with a mine-mouth power plant. Chaco had planned to have major construction for this mine completed by 1984.

The coal of interest is within the Fruitland Formation, which is underlain by the Pictured Cliffs Sandstone, and is overlain by the Kirtland Shale. The area of interest is located on the north-dipping south flank of the San Juan Basin. The coal beds dip to the north and northeast from 1° to 2.5°. Current drilling programs have not encountered faults but they are suspected to be present in small numbers.

Exploration proved that many beds of coal exist, but few are in sufficient thickness suitable for mining. Due to the complex geology associated with the deposition of the coal, the coal beds are contained in several zones. The lowest zone, the Orange Zone, contains one to four subdivisions containing more than 20 feet of coal. The Orange Zone merges with the upper Browns subdivision of the Brown Zone.

The Brown Zone is the most widespread in the Star Lake Area. The Brown Zone by itself in the middle of the area is 16 to 17 feet thick. In combination with the Orange Coal, it forms a sequence of mostly coal that is 25 feet thick. Above this zone is the Gray Coal, which attains a thickness of 2.7 feet and is not commercial. Two much higher units, the Turquoise and the Silver are almost indistinguishable and contribute a mineable thickness of about 20 feet.

Coal Quality Analysis was performed as a typical sample and not by bed.

	Run of Mine	Washed Coal
Btu/lb	7,854	9,280
Moisture %	13.19	16.85
Ash %	28.64	16.43
Sulfur %	0.66	0.58
Carbon %	44.11	52.94.

Star Lake will be a surface mining operation that will mine 6,000,000 tons of coal by the fifth year of operation and at full operation will mine 8,000,000 tons per year. Over the 35 year mine life, Chaco expects to recover 265,000,000 tons.

The Mine plan for Star Lake calls for an open pit mine. Three overburden stripping techniques will be employed: scraper hauling; simple sidecasting with a dragline; and a combination of the two. At an approximate 60 foot stripping depth, a benching program will be initiated. Thin seams will be recovered by large backhoes or by front-end loders. Most of the coal loading will be done by electrically powered loading shovels into 150-ton capacity coal haulers. Chaco expects to recover 90 percent of the coal before washing.

As the rectangular pit moves forward, overburden is removed from in front of the pit and moved to fill in where coal has been removed. Reclamation equipment follows the mining equipment closely to ensure that full reclamation of the land is rapidly concluded.

Coal from the bottom-dump haulers is to be fed into a primary crusher to be reduced to an appropriate size. From here the coal will be conveyed to a secondary crusher/sample station. Most of the coal will be moved to a 120,000 ton storage pile or to the 55,000 ton wash plant surge pile. Coal will be washed to reduce the sulfur and ash content.

Crushing and washing operations are expected to be on a schedule of 2 shifts per day, 315 days per year at an average rate of 1,588 tons of coal per hour. The plant is capable of operating at the capacity of 2,000 TPH for short periods. The maximum train-loading facilities will be 3,000 TPH; at maximum production, 770 unit trains per year can be expected (15 per week). A maximum train load can be 10,400 tons and a maximum of three trains can be loaded per day.

Production for the mine is expected to be as follows:

NM-12

PRODUCTION SCHEDULE, STAR LAKE MINE

Year	ANNUAL PRODUCTION SCHEDULED
1*	3 MMT (1)
2	3 MMT
3	4 MMT
4	6 MMT (2)
5	6 MMT
6-9	8 MMT (6)
10-14	8 MMT (3)
15-20	8 MMT (4)
21-Depletion of Reserves	8 MMT (5)
Total	265 MMT

(1) All scraper operation
(2) Start up of the first 60 cu.yd. dragline
(3) Start up of the second 60 cu.yd. dragline year 10
(4) Start up of the first 90 cu.yd. dragline year 15
(5) Start up of the second 90 cu.yd. dragline year 21
(6) Full production

*Initial production currently planned for 1985-86.

SOURCE: MINING PLAN FOR THE STAR LAKE MINE

NM-12

Production Capability Analysis

The mining plan submitted by Chaco Energy for the proposed Star Lake Mine is based on a variation of the terrace pit or open pit coal mining techniques currently in use in the Powder River Basin of Wyoming and certain other locations. This technique provides a more flexible and selective overburden removal system when compared to the traditional dragline strip mining technique.

The two 60-cubic-yard and the two 90-cubic-yard draglines plus the scraper fleet should be more than adequate for the overburden removal required for an 8 million ton-per-year coal production rate. Similarly, 21 cubic-yard loading shovels, augmented by backhoes and rubber-tired front-end loaders, loading into 150-ton coal haulage trucks will be adequate for the coal mining function.

The only mining problem described in the proposed mining plan is the presence of rock splits and partings in the coal zones. Apparently, the company has decided to mine this material along with the coal with the intention of using a coal preparation plant to remove this extraneous material. The alternative to this approach is to selectively mine the coal and separate out the partings during mining. However, this alternative could be too time consuming for the high production rate planned for the Star Lake mine.

As with the other proposed mines in this region, there has been some concern about the potential for successful long-term revegetation of disturbed lands. Despite this concern, state and federal authorities are approving permits for surface mines in the area. The uncertainty about the reclaimability of these lands is not expected to be an obstacle to approval of the mine plan.

Diligent Development Analysis

The potential for a successful surface mine definitely exists at Star Lake. There are no apparent mining obstacles which would prevent the company from reaching its planned production rate of 8 million tons per year. The questions remaining at this time are in regard to the reclamation potential for the disturbed land and as to whether the Star Lake-Bisti rail line will be constructed so that the coal can be moved to market. Both of these questions remain unanswered at the present time. If these questions are answered in the positive in the near future and if the proposed mining plan is approved, then it will be possible for the mine to be in limited production by 1986. If this does occur, then it is projected that the company will remain in compliance with the requirements for diligent development and continuous operation. The amount of coal required to be produced to meet diligence requirements for the single pre-1976 lease on the mine is relatively small and could be achieved in the first year or so of operations.

If this chain of events does not take place rapidly enough and if the mine plan is not disapproved, then it might qualify for an extension to 1991 to meet diligence because of these problems are beyond the control of the company.

STATE: New Mexico **REGION:** San Juan River **COUNTY:** McKinley

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
STAR LAKE	CHACO ENERGY	NM2457	18220	6336.12		S	Submitted	8.0

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 265.0

SOURCE: M. P.

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: New Mexico REGION: SAN JUAN RIVER COUNTY: McKINLEY

MINE NAME (OR LEASE BLOCK): STAR LAKE

LESSEE(S) (OR OPERATOR): CHACO ENERGY

NUMBER OF LEASES IN BLOCK OR PLAN: 1

MINING METHOD: S

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	ORANGE	BROWN	TURQUOISE	SILVER				
FORMATION	FRUITLAND	→	→	→	*(1)	*(2)		
RANK								
THICKNESS					7,854	9,280		
Btu/LB					0.6	0.58		
SULFUR (%)					28.64	16.43		
ASH (%)					13.19	16.85		
MOISTURE (%)					44.11	52.94		
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND				

NOTES: *(1) RUN OF MINE

*(2) WASHED COAL

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: New Mexico **REGION:** San Juan River **COUNTY:** McKinley

MINE NAME OR LEASE BLOCK: Star Lake

LESSEE(S): Chaco Energy

NUMBER OF LEASES: 1

DATE MINE OPENED:

PROJECTED CLOSING DATE:

REMAINING MINE LIFE: 35

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY 8.0

RECOVERY RATE: 90

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990			
Post 1990			

NOTES: Prod Sched

yr	TPY
1,2	3.0
3	4.0
4,5	6.0
6-35	8.0
TOTAL	265.0

All Figures Shown In Million Tons

PRODUCTION SUMMARY

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BLACK LAKE MINE

EASTERN ASSOCIATED COAL CORPORATION/FANIN SQUARE CORPORATION

LEASE NUMBER NM10931 (1,910.20 Acres)

SAN JUAN COUNTY, NEW MEXICO

The leasehold lies approximately 50 miles south, southeast of Farmington, New Mexico, and approximately 10 miles north of Chaco Canyon National Monument. The leasehold is bordered on the north and east by Preference Right Lease Applications (PRLA's) under the control of Eastern Associated/Fanin Square and consists of approximately 16,000 acres.

The leasehold and PRLA's are located in an area of low relief. Only one coal bed of commercial thickness and quality has been identified in the immediate area. The coal bed, located in the Fruitland formation, is subbituminous and ranges in thickness from 12 to 20 feet. The coal bed is surface minable on the leasehold. As you advance on the PRLA's to the north and east, the depth of the coal bed increases beyond the approximate maximum stripping limit of 150 feet. The coal with overburden in excess of 150 feet could be mined by underground methods. (It is uncertain in this area if an underground mine would be cost competitive with a surface mine.)

The area covered by the leasehold and PRLA's contains in excess of 400 million tons of surface recoverable coal. A proximate analysis (as received) is as follows:

Ash	18%
Moisture	14.5%
Sulfur	0.8%
Volatile Matter	37.7%
Fixed Carbon	34.0%
Heat Value	9800 Btu/lb

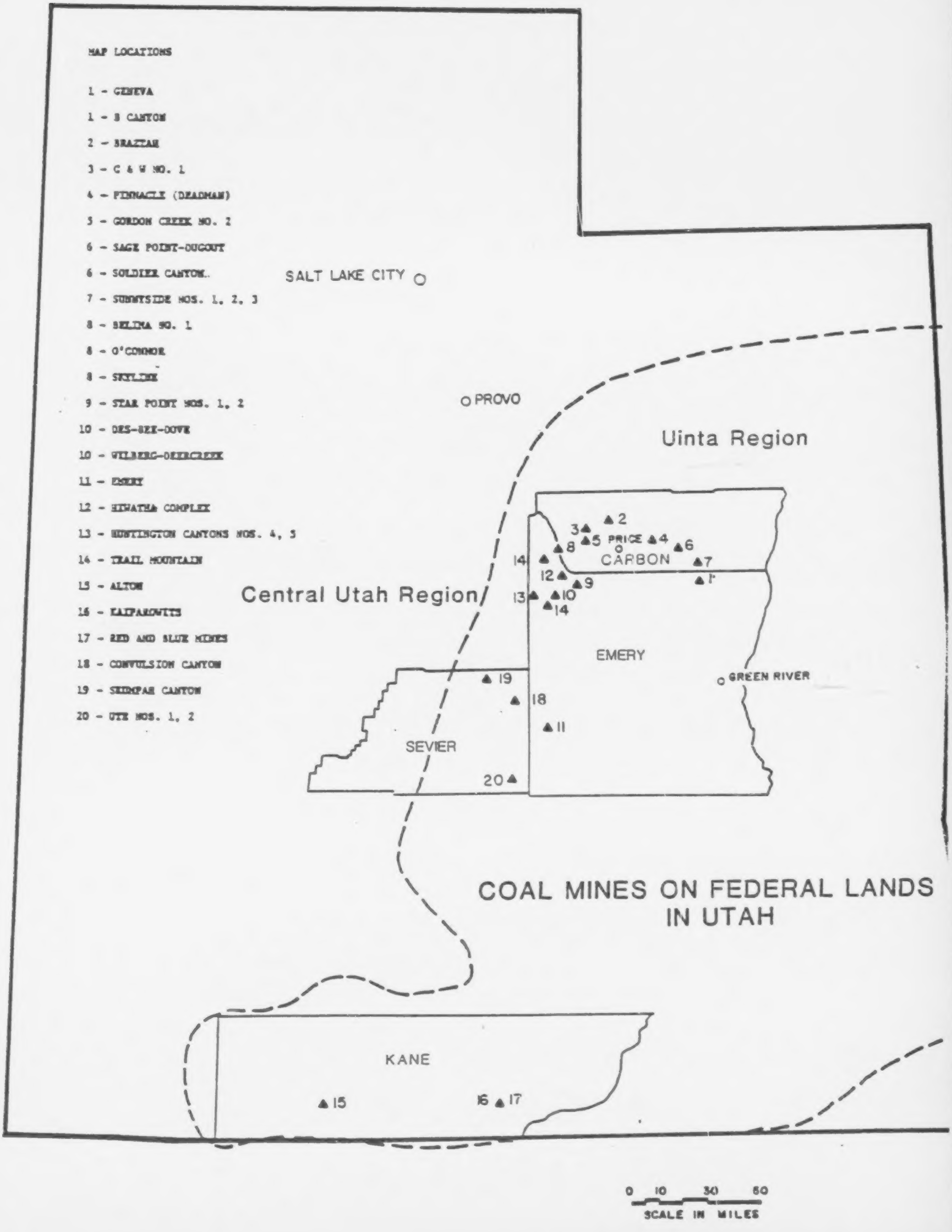
Assuming that the lease and PRLA's would be combined into a logical mining unit which would be mined out in 40 years or less, the annual production rate would be in excess of 10 million tons per year. Considering the stripping rtio, approximately 7-9:1, it is assumed that the surface mine would utilize draglines as the primary stripping equipment.

The DOI plans to have finished the processing of all PRLA's in 1984. Assuming the PRLA's are issued and combined with the lease into a logical mining unit, approximately 4 million tons of coal will have to be mined by 1996 in order to meet diligent development. Approximately 4 million tons per year will have to be mined after diligent development is met in order to achieve continued operations.

At the present, the transportation system in the immediate area of the leasehold consists of a light duty road. It is assumed that the coal would be transported by rail spur approximately 10 miles north to the rail line proposed by Star Lake Railroad Company.

Assuming a 6 to 10 year development period, the LMU could reach full production, 10 million tons per year by 1990 if action is undertaken shortly by the lessee. This being the case, the lessee could achieve diligent development.

If the lessee is not combined with the PRLA's into an LMU approximately 800,000 tons of coal must be mined by 1986 to achieve diligence. This goal should be achievable is actions to obtain an approved mine plan are taken by the lessee in the near future. Development of this lease is dependent on issuance of associated PRLA's and construction of the Star Lake Railroad or of a near-site coal synfuels plant or powerplant.


MAP LOCATIONS
1 - GENEVA
1 - B CANYON
2 - BRAZTAH
3 - C & W NO. 1
4 - PINNACLE (DEADMAN)
5 - GORDON CREEK NO. 2
6 - SAGE POINT-DUGOUT
6 - SOLDIER CANYON
7 - SUNNYSIDE NOS. 1, 2, 3
8 - BELINA NO. 1
8 - O'CONNOR
8 - SKYLINE
9 - STAR POINT NOS. 1, 2
10 - DES-BEE-DOVE
10 - WILBERG-DEERCREEK
11 - EMERY
12 - HIAWATHA COMPLEX
13 - HUNTINGTON CANYONS NOS. 4, 5
14 - TRAIL MOUNTAIN
15 - ALTON
16 - KAIPAROWITS
17 - RED AND BLUE MINES
18 - CONVULSION CANYON
19 - SKUMPAH CANYON
20 - UTE NOS. 1, 2
SALT LAKE CITY
PROVO
Uinta Region
Central Utah Region
PRICE
CARBON
EMERY
GREEN RIVER
SEVIER
KANE
1
2
3
4
5
6
7
8
9
10
11
12
13
14
14
15
16
17
18
19
20
0 10 30 60
SCALE IN MILES

COAL MINES ON FEDERAL LANDS IN UTAH

B CANYON MINE
U.S. STEEL CORPORATION
MAP LOCATION U - 1

FEDERAL COAL LEASE: SL068754 (2,570.67 Acres)
CARBON COUNTY, UTAH

The proposed minesite is in the Book Cliffs coal field in Carbon County, Utah, 12 miles north-northwest of the Geneva mine and about 25 miles east of Price. A highway and rail spur from East Carbon is proposed for access to the mine. The proposed highway route is near an existing unimproved road from East Carbon to the mine area and the rail spur would join an existing Denver and Rio Grande Western Railroad (D&RGW) spur line near East Carbon.

The proposed B Canyon mine would replace the company's Geneva mine, which is expected to be depleted in 1991-92. The B-Canyon lease is not contiguous to the Geneva Mine. According to U.S. Steel, the B-Canyon reserves are classed as coking coal and are dedicated to the supply the USS steel producing operation in Orem, Utah.*

The Castlegate Sandstone and other thick sandstone beds of the Upper Cretaceous Mesaverde Group (Fig. 1) from cliffs and account for the rugged topography. Above this section in the lease area, the Price River, North Horn, Colton, and Green River Formation are also exposed. The Mancos Shale underlies the Mesaverde Group at the base of the cliffs. The regional strike is parallel to the face of the Book Cliffs, and dips are 7° to 10° to the northeast, away from the cliff face. The project area has not been surveyed for paleontological resources. The mining plan states that no faults are known on the B Canyon property, but Doelling (1972, p. 383, and Figure 36, p. 384, 385) indicates a northwest-trending fault in the southern part of the secs. 10 and 11, T. 14 S., R. 13 E. A parallel fault 0.8 miles southwest is outside the southwest boundary of the property. Displacement on the faults exceeds 100 feet in some places.

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*In 1981, U.S. Steel assign the B-Canyon lease to Standard Oil of Ohio (SOHIO). It is expected that future coking coal needs of U.S.S. Utah steel operations will be met from the Geneva mine and other USS western mines and from contracted purchases.

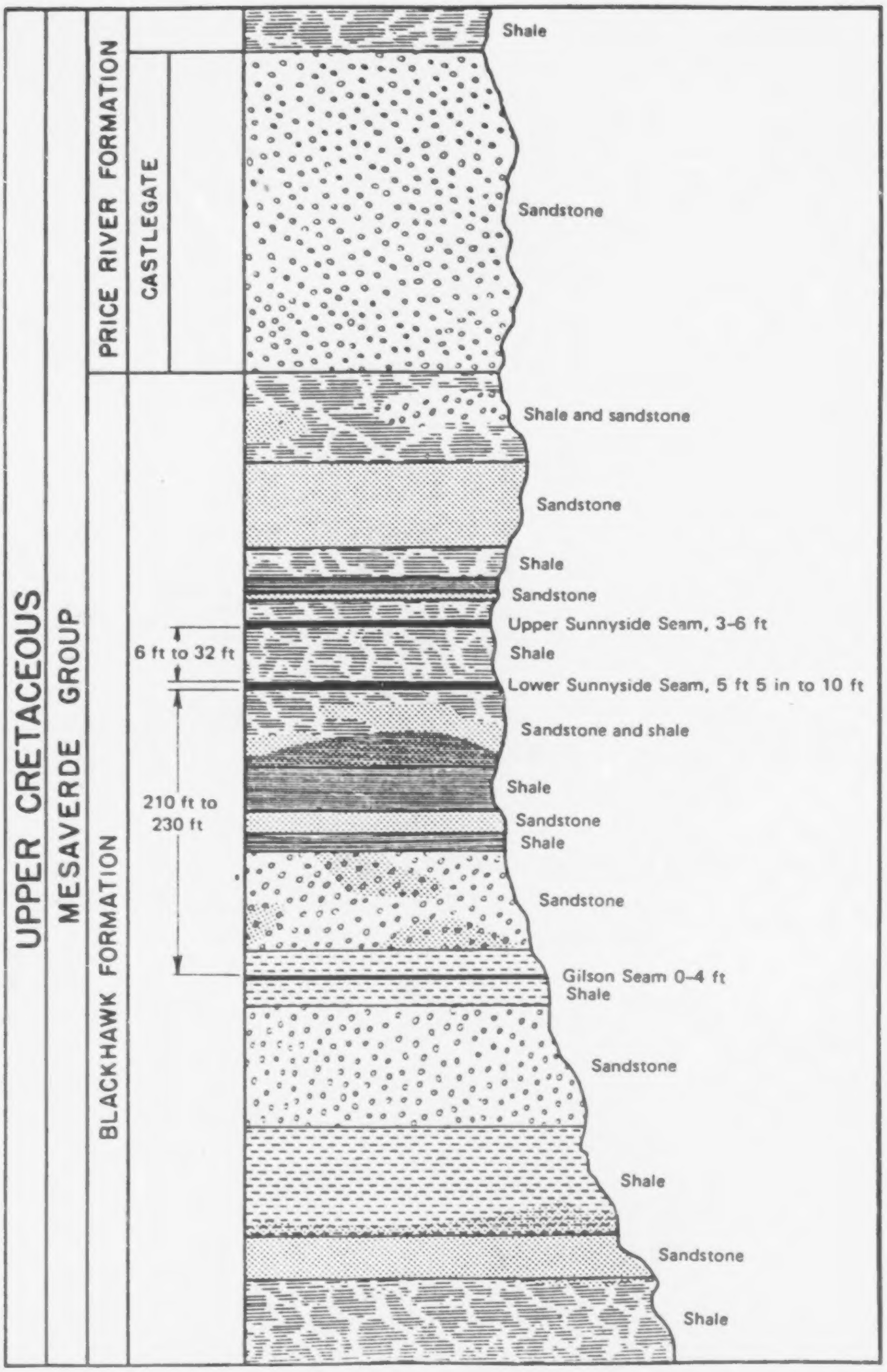
UPPER CRETACEOUS
MESAVERDE GROUP
PRICE RIVER FORMATION
CASTLEGATE
BLACKHAWK FORMATION
6 ft to 32 ft
210 ft to 230 ft
Shale
Sandstone
Shale and sandstone
Sandstone
Shale
Sandstone
Upper Sunnyside Seam, 3-6 ft
Shale
Lower Sunnyside Seam, 5 ft 5 in to 10 ft
Sandstone and shale
Shale
Sandstone
Shale
Sandstone
Gilson Seam 0-4 ft
Shale
Sandstone
Shale
Sandstone
Shale

FIGURE .--Sketch showing age and sequence of rock units in the B Canyon property area.

21B, #4

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The B Canyon mine will extract coal from the Lower Sunnyside seam and where safely and economically possible, from the Upper Sunnyside seam. These two coal beds are in the Blackhawk Formation of Cretaceous age and have been explored by prospect openings along the outcrop, drilling, and an exploration tunnel driven from the adjacent Sunnyside No. 1 mine of Kaiser Steel Corporation. The coal-bearing rocks in the B Canyon area dip 7° to 10° to the northeast. Access to the Lower Sunnyside seam from the plantsite would be through a rock tunnel starting well below the seam on a bearing parallel to the dip, and on a 2 percent upgrade, to intersect the seam about 5,000 feet from the portal.

Lower Sunnyside unrecoverable coal is 27,000,000 of the 48,000,000 tons of total estimated reserves. An unknown amount of coal in the Upper Sunnyside and Gilson seams is also unrecoverable. During the life of the mine, improved mining methods, unforseeable economic conditions and (or) changes in Federal government regulations may reduce the amount now considered unrecoverable in the Upper and Lower Sunnyside and the deeper Gilson seams.

Quality analysis is only available for the Lower Sunnyside seam from Keystone Coal's "U.S. Coal Mine Production by Seam".

Proximate washed Mean Analysis

Moisture %	8.7
Volatile Matter %	40.2
Fixed Carbon %	53.0
Ash %	6.7
Sulfur %	1.1
Btu/lb	13,720

Reserves for the Lower Sunnyside seam are distinguished as being under Federal lease or State lease:

	Federal Lease	State Lease
In-place reserves	31,000,000	17,000,000
Recoverable Reserves at 50 percent	15,600,000	5,000,000

A room and pillar system would be used to block out the long panels needed for longwall mining and also to recover coal in more confined areas, particularly in the vicinity of the coal outcrop in the Book Cliffs. Both continuous and longwall mining machines would be used. Transportation of coal within the mine and from mining faces to the portal would be by shuttle car and conveyor belt. Mine cars on tracks would haul men and supplies. From the portal, the coal would continue by conveyor belt to a storage silo, where railroad cars would be loaded and the coal hauled to the existing preparation plant near Wellington. Production from the mine is estimated to be about 1,000,000 tons per year at peak capacity.

The proposed plantsite and nearby facilities require about 480 acres of public land on which the company has applied for a temporary land-use permit. The plantsite at the mouth of B Canyon would cover an area of 60 to 75 acres. A storage area for explosives and a culinary water tank would cover 3 to 4 acres about 2,000 feet up B Canyon from the plantsite. Ventilation fans would be located in A, B, and C Canyons, accessed by graded dirt roads from the plantsite.

23B, #4

PRODUCTION SCHEDULE

Year	Estimated Production
1	-0-
2	-0-
3 (1988)	402,000
4	600,000
5	685,000
6	980,000
7	816,000

Coal mined during mine development would be transported by truck using the existing access road. The road would have to be improved and temporary loading and dumping facilities would have to be installed. The mining plan does not include details or specifications for these facilities.

Source: Final Environmental Statement, Central Utah & Coal, 1979.

STATE: UTAH **REGION:** UINTA **COUNTY:** CARBON

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
B CANYON	U.S. STEEL CORP.	U068754	3921.5	2570.67		U.G.	INCOMPLT M.P.	1.0

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 48.0

RECOVERABLE: 20.6

SOURCE: M.P.

ASSOCIATED LEASES WITH REASONS WHY:

All Figures Shown in Million Tons

COMMENTS:

TO REPLACE THE GENEVA MINE

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: UTAH REGION: U INTA COUNTY: CARBON

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
B CANYON	U.S. STEEL	1	U.G.

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	L. SUNNYSIDE							
FORMATION	BLACKHAWK							
RANK	bit.							
THICKNESS								
Btu/LB	13,720							
SULFUR (%)	1.1							
ASH (%)	6.7							
MOISTURE (%)	8.7							
FIXED CARBON (%)	53.0							
VOLATILE (%)	40.2							
SEAM DEPTH								
IN-PLACE RESERVES	48.0							
RECOVERABLE RESERVES	20.6							
RECOVERY RATE	50							

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND	31.0	17.0	48.0	
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND	15.6	5.0	20.6	M.P

NOTES: Beds Dip 7° to 10° NE

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: UTAH **REGION:** UINTA **COUNTY:** CARBON

MINE NAME OR LEASE BLOCK: B CANYON

LESSEE(S): U.S. STEEL

NUMBER OF LEASES: 1

DATE MINE OPENED: 1988

PROJECTED CLOSING DATE: 2013

REMAINING MINE LIFE: 25

REMAINING RECOVERABLE RESERVES:

FEDERAL: 15.6

NON-FEDERAL: 5.0

MINE DESIGN CAPACITY 1.0

RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983			
1984			
1985			
1986			
1987			
1988	0.402		
1989	0.600		
1990	0.685		
Post 1990	18.913		

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

11A, #3

BRAZTAH NOS. 3-5-6-7 MINES

MAP LOCATION U- 2

BRAZTAH CORPORATION (FRANKLIN REAL ESTATE)

FEDERAL COAL LEASES:

U0148779	(1240.00 Acres)	U058184	(693.89 Acres)
U0146345	(1160.00 Acres)	SL071737	(1960.00 Acres)
SL046652	(802.36 Acres)	U25484	(633.84 Acres)
SL048442	(2562.88 Acres)	U25485	(543.42 Acres)
SL029093	(1284.42 Acres)	U019524	(645.12 Acres)

CARBON COUNTY, UTAH

The mine area, held by Braztah, a subsidiary of McCulloch Oil Company, is located 10 miles north of Price, Utah, to the west of U.S. Highway 50. Braztah was issued the short-term application U25683 on December 1, 1979, it is comprised of 1172.71 acres and has not been indicated as being in their mining plan.

The LMU for the Braztah mine involves 20,325.93 acres of an estimated 26,200 acres held by Braztah. Of the LMU acres, 11,525.93 are Federal, approximately 2,300 are State, 1,100 acres are County and 5,400 acres are Fee lands. The remaining acreage was not included in the mine plan for various reasons.

The major rock units within the mine area are the Cretaceous Star Point Sandstone, Black Hawk Formation, Castle Gate Sandstone and Price River Formation, and the Tertiary North Horn Formation The Blakchawk is the major coal Producer in the Book Cliffs and Wasatch Plateau region.

Analyses of core drill samples typical of clean coal from various seams as reported by Braztah follow:

Seam	Internal Feet	Moisture Percent	Ash Percent	Btu/ Pound	Sulfur Percent
Castle Gate "D"	7.9	2.1	7.22	13,205	0.40
Castle Gate "B"	12.7	1.89	6.11	13,472	0.26
Castle Gate "A"	5.9	1.90	7.36	13,409	0.34
Castle Gate "A"	6.0	2.81	7.94	13,007	0.34
Sub-Seam 2	6.3	2.79	7.76	13,099	0.56
Sub-Seam 3	6.0	1.78	7.83	13,373	0.42
Sub-Seam 3	6.0	3.01	7.18	13,292	0.37
Kenilworth	10.3	4.24	5.70	13,172	0.26

Average analysis weighted according to ore reserve is: Moisture - 2.1 percent, Btu/lb - 13,300, Ash - 7.0 percent, Sulfur 0.34 percent.

Gates Engineering Company, a consulting firm in Beckley, West Virginia, estimates recoverable reserves of the 26,220 acres by seam at:

Recoverable Reserves of Clean Coal
(Thousand Tons)

	Assured	Probable	Total
Castlegate "D" (North American "F")	30,303	8,754	39,057
Kenilworth (North American "D")	10,495	7,275	17,770
Castlegate "C" (North American east of Price River)	4,201	899	5,060
Castlegate "B"	39,868	21,241	61,109
Aberdeen (Castlegate "A")	30,351	22,096	52,447
Sub-Seam No. 1	3,219	4,801	8,020
Sub-Seam No. 3	24,173	22,708	46,881
TOTAL	142,610	87,734	230,344

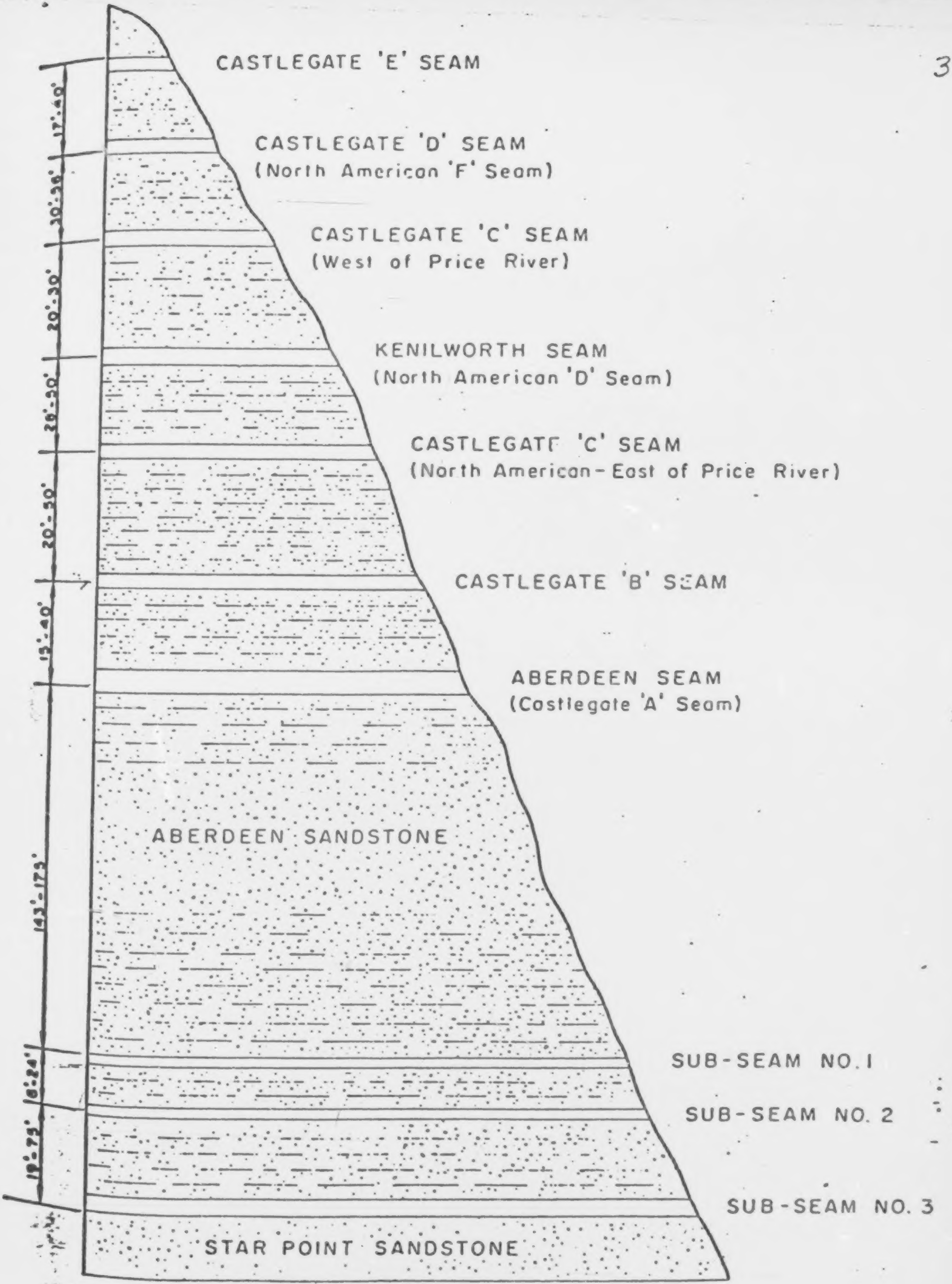

CASTLEGATE 'E' SEAM
CASTLEGATE 'D' SEAM
(North American 'F' Seam)
CASTLEGATE 'C' SEAM
(West of Price River)
KENILWORTH SEAM
(North American 'D' Seam)
CASTLEGATE 'C' SEAM
(North American - East of Price River)
CASTLEGATE 'B' SEAM
ABERDEEN SEAM
(Castlegate 'A' Seam)
ABERDEEN SANDSTONE
SUB-SEAM NO. 1
SUB-SEAM NO. 2
SUB-SEAM NO. 3
STAR POINT SANDSTONE
17'-40'
30'-35'
20'-30'
20'-30'
20'-30'
15'-40'
143'-175'
6'-24'
19'-75'

Fig. #15
Generalized Columnar Section
Spring Canyon - Castle Gate Area

Gates Engineering classified coal seams as mineable if they are at least 5 feet thick and contain no more than 35 percent waste.

An estimate made by Roy Full, Braztah Consulting Mining Geologist, in a November 4, 1974 letter to the BLM was 129,600,000 tons of assured, recoverable coal. This coal was determined to contain 86,7000,000 tons on Federal leases, 19,8000,000 on State leases, 2,200,000 on County leases, and 20,900,000 on Fee land.

Underground Mine Development Methods

To meet the production levels contemplated, development is scheduled for an expansion of operations in the Sub-seam No. 3 Mine and the opening of new mines in the Castle Gate 'A', 'B', 'D', and Kenilworth seams. Much of the production during the early years will come from an accelerated development program that has been designed to provide sufficient working areas with adequate ventilation to attain the maximum production rate by the end of 1982. Through existing workings and new development, all of the mines will be connected by conveyor belt haulage to the wash plant and load-out facilities on the Denver & Rio Grande Western Railroad at Castle Gate.

Production is currently derived from continuous miner units in room and pillar and entry development operations in the No. 3, No. 4 and No. 5 Mines. These continuous miner units employ shuttle car face haulage, discharging through belt feeders on to belt conveyors which transport the coal from the mines. Long-wall development is in progress in the Braztah No. 3 Mine with the first longwall unit scheduled for production during the first half of 1976. Longwall units will consist of a shearing machine, chain conveyor, and hydraulic self-advancing props. Longwall faces are planned for 500-foot length.

Multiple seam mining dictates that the uppermost seam usually will be mined first - with lower seams usually mined in descending order. Continuous miners will have the capability to mine seams from 4 feet to 9-1/2 feet in thickness. If seam thicknesses are greater than

9-1/2 feet, the extra thickness will be mined during retreat and pillar extraction operations. Longwall equipment will be used where practicable in order to achieve the highest possible extraction.

Coal is transported from the mine by one of three main conveyor belt systems. Once conveyor is in the No. 3 Sub-seam, southwest of the existing plant and extends through three miles of existing mine workings. The other two belts are in two sets of parallel rock slopes, designed to circumvent abandoned and hazardous mine workings that create access problems to the mineable coal reserves. One pair of slopes are to be used to mine the Castlegate A, B, and D seams located north and northwest of the plant. The other pair of slopes are to be used for mining the Castlegate A or Aberdeen seam and the Kenilworth seam located north and northwest and east of the plant. Sixty percent of the coal produced in the mine could be transported by the use of this conveyor system.

Production from the Federal leases is expected to be 3,645,000 tons per year by 1981, total mine plan production is expected to reach 6,500,000 tons per year through at least the year 2001.

Braztah has a contract agreement with American Electric Power Corporation to supply 6,500,000 tons of coal annually through the following production schedule:

1st year	960,000 tons
2nd year	2,500,000 tons
3rd year	3,600,000 tons
4th year	4,900,000 tons
5th year	5,400,000 tons
6th year	6,100,000 tons
7th year and each succeeding year thereafter for 20 years	6,500,000 tons

To transport the annual production of 6,500,000 tons of coal would require 1,300 unit-trainloads per year, assuming an average 5,000 tons per unit-train. This would require a daily average of approximately 3.6 loaded coal trains and 3.6 empty returning trains for a total average traffice increase of 7.2 unit-trains per day.

The coal is to be transported on the Denver and Rio Grande Western's existing railroad lines through Price, Utah, to Denver, Colorado, and ultimately to Metropolis, Illinois.

Production Capability Analysis

The scale of the underground mining complex that is being developed at the Braztah operation certainly makes this one of the most ambitious undertakings anywhere in the world. The company has carefully and methodically assembled the components which will allow for a production rate that is nearly equivalent to 30 percent of the annual production capability of the entire State of Utah and 1 percent of the production of the United States.

One of the key elements of the Braztah complex is the development of an underground transportation corridor consisting of a set of drifts in the coal seams and connecting rock slopes which allows the company to efficiently collect coal production from 4 mines operating in 8 seams and to move it by conveyor to a single point on the surface where the coal is cleaned and loaded directly on to unit trains. Even though the coal produced from the Braztah mines is of exceptionally high quality, the company has correctly deduced that it must take advantage of every possible efficiency to be able to deliver its product to the midwestern steam coal market at a profit.

The 26,200-acre Braztah LMU contains a variety of mining conditions, therefore, it is necessary for the company to remain flexible in its approach to the mining of the coal. It has developed capabilities in continuous miner room and pillar, shortwall and longwall mining techniques. Although, the company has preliminarily designated certain mines and portions of mines for application of one or another of these mining techniques, it realizes that information gained during future mining operations may change one or more of these designations. The major consideration is to use longwall mining, with its high recovery rate and low labor input, wherever it is appropriate.

There are several potential mining problems that must be contended with at Braztah. Perhaps the most significant one is the number of abandoned mine workings present on the LMU. These have been identified to the degree possible but it will be necessary to wait until mining operations enter some of the previously mined areas to see what impact subsidence has had on future mining conditions.

As is the case with the majority of the mines located along the Book Cliffs, there has been faulting which has disrupted continuity of the seams. The results of exploration drilling conducted to date indicate that the maximum throw for faults present on the Braztah LMU is on the order of 20 feet. The company feels that it can tolerate this amount of displacement without it having a significant impact on development and mining operations.

Because of the magnitude of the complex, it is difficult to assess the correctness of the reserves estimate for Braztah. However, a few simple calculations indicate that the 230 million-ton estimate is of the correct order of magnitude. A 6-foot thick seam extending over the entire 26,200 acres in the LMU would translate into approximately 250 million tons of in-place reserves. Since Braztah is working with as many as 7 seams varying in thckness from 4 to 9 1/2 feet, the company's estimate of 230 million tons of recoverable reserves does not seem unreasonable.

As indicated above, the company has devoted careful attention to the organization of its subsurface and surface transportation systems. The planned daily rate of approximatey 7 unit-train loadings means that the loading facilities will be in opertion continuously at least 2 shifts a day. The fact that the company will have 24 50-car trains in motion almost continuously between the mine and destination points in Illinois and Indiana, means that the rail link itself will be a major factor in the complex being able to attain the 6.5 million-ton-per-year production rate.

Since the operations at Braztah will be contained almost entirely underground, there will be limited impact on the surface environment. The most significant impact will be the operation of the coal preparation plant. Rejects from this plant are scheduled for disposal in a nearby canyon located on fee land. The company has taken precautions to ensure that the disposed of material will not contaminate surface water runoff.

The other significant environental impact will be subsidence. Depending upon the number of seams that are being mined under a given location, the total subsidence could amount to 20 feet or more. However, because of the appreciable depth of cover over most parts of the LMU, this should not result in actual breaks in the surface elevation that will not be apparent to the casual observer.

Diligent Development Analysis

If the company does ultimately recover 230 million tons of coal from the Braztah LMU, the planned production rate of 6.5 million tons per year would result in a mine life of 35 years. Hence, the company will be in compliance with the requirements for diligent development and continuous operation.

STATE: Utah **REGION:** Uinta **COUNTY:** Carbon

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Braztah Mines	Braztah	U0148779		1240.0		U/G	Approved	6.5
	corp.	U0146345		1160.0		①	4-27-77	
	(Franklin	SL046652		802.36				
	Real Estate)	SL048442		2562.88				
		U058184	20325.93	693.89	8800			
		SL071737		1960.0				
		SL029093		1284.42				
		U25485		633.84				
		U019524		645.12				
		U25484		543.42				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE:

SOURCE:

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:
U25863 pending application contains
16.0 recoverable tons

COMMENTS:
① Continuous miners and longwall mining
Coal of high quality, therefore greater demand
Exploration program underway

STATE: Utah REGION: Uinta COUNTY: Carbon

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
Braztah Mines	Braztah Corporation	10	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Castlegate D	Castlegate B	A	A1	Subseam 2	Subseam 3	Subseam 3	Kenilworth
FORMATION	Blackhawk	→	→	→	→	→	→	→
RANK	Bit	→	→	→	→	→	→	→
THICKNESS	7.9	12.7	5.9	6.0	6.3	6.0	6.0	10.3
Btu/LB	13,200	13,500	13,400	13,000	13,100	13,400	13,300	13,200
SULFUR (%)	0.4	0.3	0.3	0.3	0.6	0.4	0.4	0.3
ASH (%)	7.2	6.1	7.4	7.9	7.8	7.8	7.2	5.7
MOISTURE (%)	2.1	1.9	1.9	2.8	2.8	1.8	3.0	4.2
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES ①	30.303	39.868	30.351			24.173		10.495
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND	91.112 (IC)		120.4 (Braztah)②	

NOTES: ① Based upon 26,220 acres by IC, Total estimate : Assured Recoverable = 142.61
Probable Recoverable = 87.734
Total Recoverable = 230.344

② Assuming production is as expected

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah REGION: Uintah COUNTY: Carbon

MINE NAME OR LEASE BLOCK: Braztah Mines

LESSEE(S): Braztah. Corporation

NUMBER OF LEASES: 10

DATE MINE OPENED: 1975

PROJECTED CLOSING DATE: 2001

REMAINING MINE LIFE: 21

REMAINING RECOVERABLE RESERVES: ①

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY

RECOVERY RATE:

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION	
1980	5.3	3.645	5.4	American Electric
1981	6.0	↓	6.1	Power Corp.
1982	6.5	↓	6.5	
1983	↓	↓	↓	
1984	↓	↓	↓	
1985	↓	↓	↓	
1986	↓	↓	↓	
1987	↓	↓	↓	
1988	↓	↓	↓	
1989	↓	↓	↓	
1990	6.5	3.645	6.5	
Post 1990	71.50	40.1	71.5	

NOTES: ① Due to various estimates, nothing entered

All Figures Shown in Million Tons

PRODUCTION SUMMARY

C & W NO. 1
C & W COAL PRODUCERS CORPORATION
MAP LOCATION U - 3

FEDERAL COAL LEASES: SL063011 (280.00 Acres)

BLM SURFACE LAND

CARBON COUNTY, UTAH

The C & W No. 1 Mine is approximately 15 miles northwest of Price, Utah, in Carbon county. Part of the western boundary of the mine area is formed by the old abandoned workings of the Blue Blaze No. 3 mine (also called Consumers and McGowan) which mined the same seam as is proposed for mining by the new mine.

The C & W No. 1 mine would produce coal from a Federal coal lease (SL063011) by C & W Coal Producers Corporation. The acreage proposed for mining would be located in secs. 8 and 17, 13 S., R. 8 E., Salt Lake Principal Meridian, including a small amount of BLM surface.

Coal will be developed from the Gordon Creek mining district of the Wasatch Plateau Coal Field in central Utah. The major coal seams occur in the lower half of the Blackhawk Formation, a member of the Cretaceous Mesaverde Group. The Blackhawk Formation consists of 700 to 1000 feet of fine to medium grained sandstone, interbedded with subordinate gray and carbonaceous shale is underlain by the Starpoint Sandstone, the basal member of the Mesaverde Group which can be as much as 1,000 feet thick. The Blackhawk Formation is overlain by the Castle Gate Member that consists of massive, often conglomeratic sandstone 150-500 feet thick. The Price River Formation overlies the Castle Gate Member and can be as much as 1,000 feet thick in areas. The Price River Formation is comprised of massive sandstones interbedded with some suborginate shales. The above relationships are illustrated on Figure 1.

Many faults of varying displacements have been mapped in the area. Most of the major displacements of the region (100 feet or more) trend in

System	Stratigraphic Unit		Thickness (feet)	Description
TERTIARY	Green River Formation		-	Chiefly greenish lacustrine shale and siltstone.
	Wasatch Group	Colton Formation	300-1,500	Varicolored shale with sandstone and limestone lenses.
		Flagstaff Limestone	200-1,500	Dark yellow-gray to cream limestone, evenly bedded with minor amounts of sandstone, shale and volcanic ash, ledge former.
		North Horn Formation	500-2,500	Variegated shales with subordinate sandstone, conglomerate and fresh-water limestone, slope former.
CRETACEOUS	Mesaverde Group	Price River Formation	600-1,000	Gray to white gritty sandstone interbedded with subordinate shale and conglomerate, ledge and slope former.
		Castlegate Sandstone	150-500	White to gray, coarse-grained often conglomeratic sandstone, cliff former, weathers to shades of brown.
		Blackhawk Formation MAJOR COAL SEAMS	700-1,000	Yellow to gray, fine- to medium-grained sandstone, interbedded with subordinate gray and carbonaceous shale, several thick *coal* seams.
		Star Point Sandstone	90-1,000	Yellow-gray massive cliff-forming sandstone, often in several tongues separated by Masuk Shale.
	Mancos Shale	Masuk Shale	300-1,300	Yellow to blue-gray sandy shale, slope former.
		Emery Sandstone COAL	50-800	Yellow-gray friable sandstone tongue, cliff former. *Coal* present in subsurface.
		Blue Gate Member	1,500-2,400	Pale blue-gray, nodular and irregularly bedded marine mudstone and siltstone with several arenaceous beds, weathers into low rolling hills and badlands.
		Ferron Sandstone Member MAJOR COAL SEAMS	50-950	Alternating yellow-gray sandstone, sandy shale and gray shale with important *coal* beds of Emery coal field, resistant cliff former.
		Tununk Shale Member	400-650	Blue-gray to black sandy marine slope forming mudstone.
	Dakota Sandstone MINOR COAL		0-60	Variable assemblages of yellow-gray sandstone, conglomerate shale and *coal*. Beds lenticular and discontinuous.

Generalized section of rock formations, Wasatch Plateau coal field.
After Doelling, 1972.

FIGURE 1

a north-south direction. The major displacements are usually easily mapped from topography or aerial photo interpretation.

Several faults were encountered in surrounding mines. Not many of the displacements appeared to hamper mining activity. Faulting seems to disipate rapidly north of the proposed portals opening up the possibility of several millions of tons of relatively unfaulted coal on the unleased Federal lands to the north of the property. The only fault believed to have much affect on the proposed mine area is the northeast-southwest trending fault which will be encountered by the main entries a few hundred feet from the portals. The nearest measurement of displacement to the proposed mine is only eight feet. Only minor problems are anticipated in grading through this small displacement. The dip in the mine area is generally north at a rate of 2° to 3°. The maximum overburden is less than 1,500 feet in the mine area.

The coal seam considered in this plan is the Castlegate "A" seam one of the major coal horizons in the lower portion of the Blackhawk Formation. Exposures of the coal seams in the area are fairly continuous being broken and displaced by some faulting in the canyons. The Castlegate "A" seam was reached at the Blue Blaze No. 3 mine (McGowan mine) by rock tunnels due to an outcrop burn zone on that side of the canyon. From drill holes in the area it appears that the "A" seam contains two splits of mineable thickness in the areas of previous mining. Both splits are 5 to 6 feet in thickness. From the log of an old drill hole, Blue Blaze No. 3 in sec. 8 north of the properties, it is apparent that only one Castlegate "A" split of 5+ feet in thickness continues into the unleased lands on the north. There are two other coal zones beneath the Castlegate "A" seam and above the basal Starpoint Sandstone. These are the Gordon zone 70 to 90 feet below and the Hiawatha zone another 90-120 feet beneath the Gordon. The Gordon seam is too thin on the property to be considered mineable as evidenced by drilling. The Hiawatha seam is the lowest seam in the sequence in this area and rests on the top of the Starpoint Sandstone. It ranges in thickness from about 6 to 10 feet and has been mined extensively throughout the region.

Remaining in-place mineable coal reserves for the Castlegate "A" on the property are estimated to be 1,800,000 tons. Criteria used for making the estimate were measured thicknesses in the representative drill holes, mine data available and outcrops.

The Castlegate "A" seam generally ranks as high volatile B bituminous in the area. The ash content is generally low (less than 8 percent). The average sulfur content is less than one percent and in most cases one-half of one percent or less. Heat values from analyses at the Blue Blaze No. 3 mine (McGowan) indicate a Btu/lb range of 12,500 to 13,500 on an as-received basis. The excellent characteristics of this steam grade coal make it acceptable to many markets from domestic to commercial and power generation.

Table II-1 following this page contains some representative analyses of Castlegate "A" coal from the Blue Blaze No. 3 (McGowan mine) adjacent to the proposed C & W No. 1 mine.

Due to the present property boundary configuration the anticipated maximum annual production of the C & W No. 1 mine will be about 220,000 tons per year. This production projection assumes one miner section working two production shifts per day. If, however, additional lands can be acquired, the annual production capacity could be increased to meet an increased demand. There are currently unleased Federal and county coal lands adjacent to the mine properties. The mine plan can easily be changed to accommodate the acquistion of any additional property. The first year of operation will involve the excavation and construction of surface facilities, portal opening and main entry development as well as some panel mining. Production mining will begin as soon as panels can be opened up to enable the establishment of a good cash flow for the financing of continued operation at the mine.

Room and pillar mining sections would be developed perpendicular to the main entries leaving safety barriers to protect these entries.

Castlegate "A" Seam Analyses
Blue Blaze No. 3 - McGowan Mine

Sample No.	Mine or Prospect Coal Bed	PROXIMATE ANALYSES					Sulfur %	Btu/lb.
		AN	M	VM	FC	Ash		
4	McGowan Mine	A	5.3	43.8	45.9	5.0	.5	12,830
		C	-	46.2	48.5	5.3	-	13,540
5	McGowan Mine	A	.59	44.1	43.9	6.1	.4	12,700
		C	-	46.9	46.6	6.5	-	13,500
6	McGowan Mine	A	4.5	44.1	44.4	7.0	.4	12,730
		C	-	46.2	46.5	7.3	-	13,330
7	McGowan Mine	A	6.1	42.2	45.1	6.7	.6	12,330
		C	-	44.9	48.0	7.1	-	13,130
8	McGowan Mine	A	4.1	44.2	45.3	6.4	.4	12,840
		C	-	46.1	47.2	6.7	-	13,390

Note: Above information taken from Central Utah Coal Fields, Monograph Series 3, H. H. Doelling (U.G.M.S. 1972), page 117.

Table II-1

As previously mentioned, all mining is proposed to be done with continuous miners. Coal will be loaded by the miner into electrically-powered shuttle cars which will haul it to a feeder-breaker at the belt line. A 42-inch belt will then transport the mined coal out of the mine to the crusher on the outside. After crushing, it will be transported by another conveyor to the stockpile for storage and truck loading.

Room and pillar methods will be used throughout the mine. Sections will be developed from panel entries driven through safety barriers off of the main entries and extended to the mining limit, i.e., property barrier, safety barrier around old workings, etc. Coal will then be mined from these entries, with most of the recovery coming from pillar extraction during retreat from the panels. A 60-foot ventilation barrier will be left between each room and pillar panel. The last entry in each panel will be driven through the ventilation barrier to facilitate the required bleeder system.

A pillar extraction will begin as soon as the development of a panel is complete. A typical sequence of extraction is also shown.

Entry pillars will be left to protect adjacent panels. All perimeter entries with supporting pillars will be left open to provide the bleeder system required by Federal law. All planned safety barriers meet or exceed the width recommended for mines of this type. Some coal left in barrier pillars may be recovered on retreat at the completion of the mine.

All mining proceeds the roof will be timbered or bolted and adequately supported by alternative means wherever unstable conditions are encountered. Major roof control problems are not anticipated due to the fact that through most of the proposed mine area there are massive sandstones in thick layers above the coal to promote generally good conditions.

STATE: Utah **REGION:** Uinta **COUNTY:** Carbon

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
C&W No.1 Mine	C&W Coal Producers Corp.	SL063011	280.00	280.00		U/G	INCOMPLT M. P.	0.220

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 2.355

RECOVERABLE: 1.57

SOURCE: 1C

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah REGION: Uinta COUNTY: Carbon

MINE NAME (OR LEASE BLOCK): C&W No.1 Mine

LESSEE(S) (OR OPERATOR): C&W Coal Producers Corp.

NUMBER OF LEASES IN BLOCK OR PLAN: 1

MINING METHOD: U/G

COAL CHARACTERISTICS: ②	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Castlegate A							
FORMATION	Blackhawk							
RANK	hv B Bit							
THICKNESS	5'-6' ①							
Btu/LB	12,500-13,500							
SULFUR (%)	<1.0							
ASH (%)	<8.0							
MOISTURE (%)								
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			2.355	IC
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			1.57	IC

NOTES: ① Two splits
② Analysis from Blue Blaze No. 3 Mine

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah **REGION:** Vinta **COUNTY:** Carbon

MINE NAME OR LEASE BLOCK: C&W No. 1 Mine
LESSEE(S): C&W Coal Producers Corp.
NUMBER OF LEASES: 1
DATE MINE OPENED: 1987
PROJECTED CLOSING DATE:
REMAINING MINE LIFE:

REMAINING RECOVERABLE RESERVES:
FEDERAL: 1.57
NON-FEDERAL:
MINE DESIGN CAPACITY 0.220
RECOVERY RATE: 50
CUMULATIVE PRODUCTION TO 1979: 0.93 ACLDS
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983			
1984			
1985			
1986			
1987	0.05		
1988	0.10		
1989	0.15		
1990	0.20		
Post 1990			

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

PINNACLE
(DEADMAN CANYON MINE)
AMCA COAL LEASING, INC.
MAP LOCATION U-4
FEDERAL COAL LEASES: SL027304 (120.00 Acres)
SL06358 (240.00 Acres)
U010581 (1,682.39 Acres)
FEE LANDS (200.00 Acres)
CARBON COUNTY, UTAH

AMCA Coal Leasing, Inc. a wholly owned subsidiary of AMCA Resources of Madisonville, Kentucky, purchased the Centennial Properties from Centennial Coal Associates. The Deadman and Zion Fee property is located approximately ten miles north-northeast of Price, Utah, in Deadman Canyon. The surface of the mining area is owned by the Bureau of Land Management, AMCA Coal Leasing, Inc., and private interests.

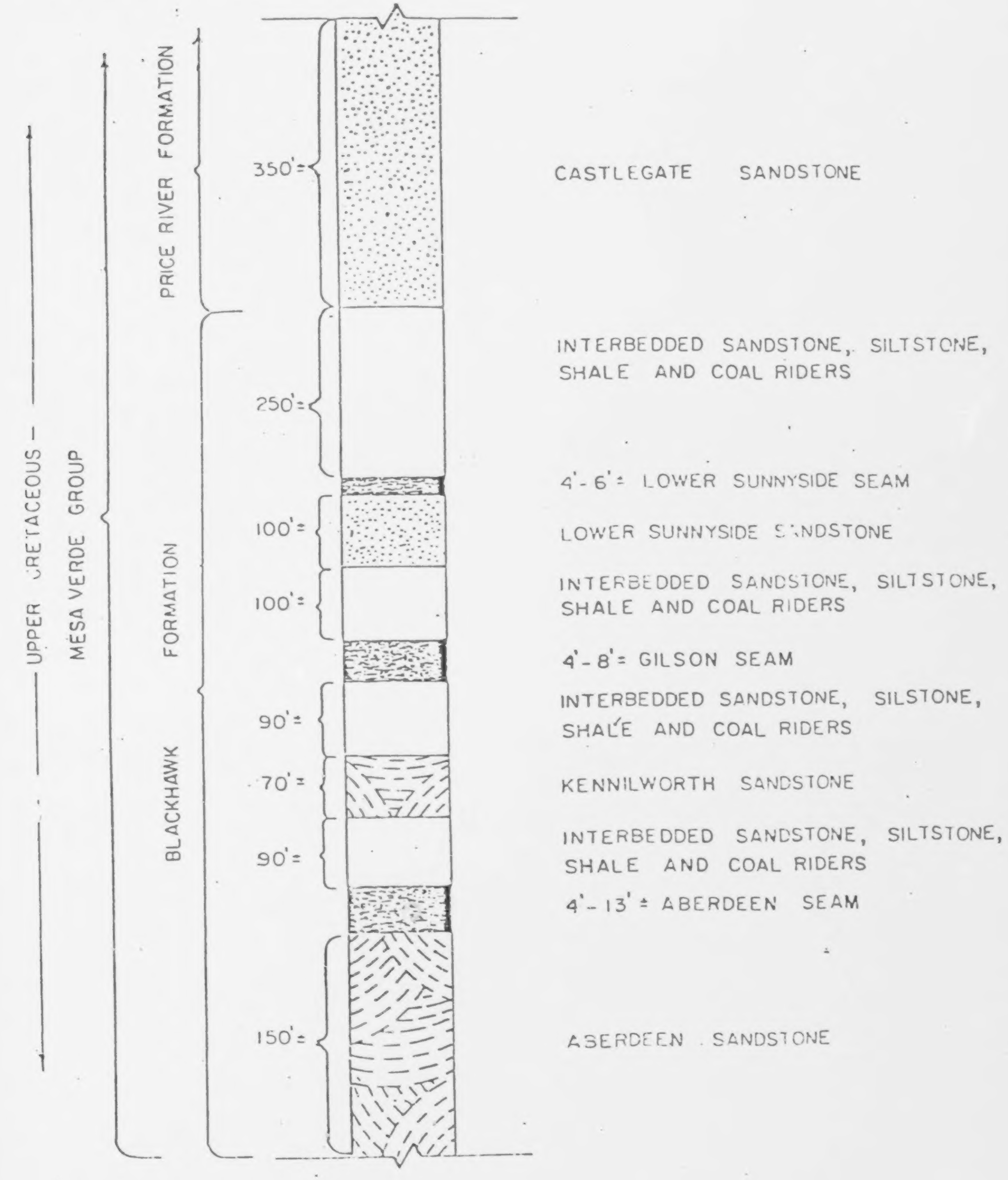
Coal seams in this area are in the Blackhawk Formation of the Upper Cretaceous Mesaverde Group. The coal beds in the area regionally dip to the north, away from the Book Cliffs face at a uniform rate of 5^{o} to 7^{o}. No major faults are known to accur in the lease area.

In the lease area, the 3 seams are of economic interest; the Lower Sunnyside, ranging in thickness from 4 to 6 feet; the Gilson seam, ranging in thickness from 4 to 8 feet; and the Aberdeen seam with a thickness range from 4 to 13 feet. Eight other beds of coal occur but their thickness makes them all unmineable, the thickness ranges from 6 inches to 3 feet, 9 inches.

Coal analysis for each seam, expressed as an average, is as follows:

	Btu/lb	Volatile %	Fixed Carbon %	Ash %	Sulfur %
Lower Sunnyside	12,607	38.64	50.89	5.51	0.63
Gilson	12,463	36.64	52.74	5.56	0.58
Aberdeen	12,708	38.16	51.56	5.20	0.67

GEOLOGIC COLUMN OF DEADMAN CANYON


UPPER CRETACEOUS
MESA VERDE GROUP
PRICE RIVER FORMATION
BLACKHAWK FORMATION
350'±
CASTLEGATE SANDSTONE
250'±
INTERBEDDED SANDSTONE, SILTSTONE, SHALE AND COAL RIDERS
4'-6'± LOWER SUNNYSIDE SEAM
100'±
LOWER SUNNYSIDE SANDSTONE
100'±
INTERBEDDED SANDSTONE, SILTSTONE, SHALE AND COAL RIDERS
4'-8'± GILSON SEAM
90'±
INTERBEDDED SANDSTONE, SILSTONE, SHALE AND COAL RIDERS
70'±
KENNILWORTH SANDSTONE
90'±
INTERBEDDED SANDSTONE, SILTSTONE, SHALE AND COAL RIDERS
4'-13'± ABERDEEN SEAM
150'±
ABERDEEN SANDSTONE

Average analyses of the coal obtained from the above beds indicate a high volatile, low sulfur bituminous coal. Reserves for the mine plan area are estimated to be 50,000,000 tons in-place and 28-29,000,000 tons in-place recoverable at 58 percent. An estimated 4,000,000 tons recoverable are indicated to be on the Fee lands.

AMCA proposes to start mining the highest of three seams first. Mining begins with two, seven entry portals on opposite sides of the Deadman Canyon, one portal is driven east and the other portal is driven west. Three continuous miners would be utilized in each entry, both using belt haulage to move the coal to the surface. Once development in the Lower Sunnyside seam progresses far enough back into the hillside, the lower seams will be started at entries farther down the canyon where the seams outcrop so as not to cause problems for the Upper seam. Production is expected to start on Fee lands as the approvals have not been received to mine the Federal land. The production schedule projects an increase from 200,000 tons per year in year 1, to 1,000,000 tons per year by the fourth or fifth year. Since the mine plan was submitted in 1976, and nothing has been approved, the exact production schedule is undetermined. An estimated mine life at the above rates would be approximately 30 years.

AMCA, working on a previous right-of-way application submitted by Centennial Resources, amended that application in 1977 and several times again in 1978 for the right-of-way from the mine site to a point on Coal Creek Road for a haul road. This right-of-way would allow a more direct route to the railroad siding located 4 miles southeast of Wellington, Utah. Approximately, 28 truck hauls are to be made daily to the railroad siding, this has caused the delay in approval, determining the alternatives and their impacts.

The greatest concern about the development of a haulage road is the impact that may occur in the construction phase of the road building. The right-of-way is considered to be an environmentally sensitive area, thus causing a bit of a problem with the approval of a haul road.

Reclamation is considered to be of an average difficulty. The surface is to be restored to the approximate original contour and any slopes created must be less than the angle of repose.

AMCA had bid on four coal contracts to supply coal with a starting production of 200,000 tons to increase to 830,000 tons per year, there was no conformation of this contract.

STATE: UTAH REGION: UINTA COUNTY: CARBON

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
PINNACLE (DEADMAN CANYON) (ZION'S Fee)	TOWER Resources INC. (1) (AMCA COAL LEASING, INC.)	SL027304 SL063058 U010581	2242.39	120 240 1682.39	200	U/G R&P	INCOMPLETE M. P.	1.0 TPY

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 50.0

RECOVERABLE: 29.0

SOURCE:
CENTRAL UTAH
EIS

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS: (1) SOURCE: OSM 11-21-80

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: UTAH   REGION: UINTA   COUNTY: CARBON

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
DEADMAN CANYON	AMCA COAL LEASING, INC.	3	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Lower Sunnyside	GILSON	ABERDEEN					
FORMATION	BLACKHAWK	BLACKHAWK	BLACKHAWK					
RANK	hv b	hv b	hv b					
THICKNESS	4-6'	4-8'	4-13'					
Btu/LB *	12,607	12,463	12,708					
SULFUR (%)	0.63	0.58	0.67					
ASH (%)	5.51	5.56	5.20					
MOISTURE (%)								
FIXED CARBON (%)	50.89	52.74	51.56					
VOLATILE (%)	38.64	36.64	38.16					
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			50.0	EIS
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND	25.0	4.0	29.0	EIS

NOTES: * REFLECTS AN AVERAGE BY SEAM.

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: UTAH **REGION:** UINTA **COUNTY:** CARBON

MINE NAME OR LEASE BLOCK: DEADMAN CANYON
LESSEE(S): AMCA COAL LEASING, INC.
NUMBER OF LEASES: 3
DATE MINE OPENED: 1982
PROJECTED CLOSING DATE: 2012
REMAINING MINE LIFE: 30

REMAINING RECOVERABLE RESERVES:
FEDERAL:
NON-FEDERAL:
MINE DESIGN CAPACITY 1.0 TPY
RECOVERY RATE: 60
CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	*		
1981			
1982	0.2		
1983	0.4		
1984	0.6		
1985	0.75		
1986	0.84		
1987	0.93		
1988	0.95		
1989	0.95		
1990	0.99		
Post 1990	22.39		

NOTES: * YEAR ONE 0.20 INCREASING TO 1.0 TPY BY YEAR 4 OR YEAR 5.

All Figures Shown in Million Tons

PRODUCTION SUMMARY

8A, #1

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GORDON CREEK NO. 2
BEAVER CREEK COAL COMPANY
(FORMERLY SWISHER COAL COMPANY)
MAP LOCATION U-5
FEDERAL COAL LEASE: U8319 (891.75 Acres)
CARBON COUNTY, UTAH

The Gordon Creek No. 2 mine portal is located in Bryner Canyon, approximately 13 miles northwest of Price, Utah. Access to the mine area is gained by Utah State Route 139, this route intersects with U.S. Highway 50-6 near Helper, Utah.

The LMU for the Gordon Creek mine is comprised of various tracts of land, most of it being Federal lands. A breakdown of the acreage leased is as follows: U8319, including the U8319-1 modification, totals 891.75 acres; Federal land authorized by the U.S.G.S. for mining covers an additional 120.00 acres; another modification on Federal lands that has been approved contains 70.0 acres; and the Fee land totals 560 acres.

The general area of the subject leases is on the Wasatch Plateau, a transitional zone between the complex Basin and Range Province to the west and the simple flat-lying rock of the Colorado Plateau to the east. The fork formations in the mine area dip less than 5° and have a strike of N 30°W.

Overburden ranges from a minimum of 250 feet to a maximum of 2,000 feet. It has been observed that the undermining of areas of thin cover may tend to increase the effects of subsidence.

The coal of economic interest in the Gordon Creek Mine is contained in two beds. The Hiawatha bed, the lower seam, has an average thickness of 6.4 feet with an overburden ranging from 650 feet to 950 feet. The Castlegate "A" seam is approximately 200 feet above the Hiawatha and has an average thickness of 6.5 feet, and ranges from 5 to 8 feet; overburden ranges from 450 feet to 750 feet.

An as received analysis of both seams follows:

	Hiawatha "A"	Castlegate "A"
Sulfur	0.56%	0.45%
Moisture	7.20%	7.77%
Ash	6.50%	8.01%
Volatile Matter	41.30%	41.74%
Fixed Carbon	44.60%	42.48%
Btu/lb	12,144	12,177

Coal of this quality is ranked as high volatile B bituminous.

Reserves in the Gordon Creek mine plan are distributed as follows:

		Recoverable Coal in million tons	Acres
Private Surface	U8319-1 Mod	4.427	480
Private Surface	Mod. of 120 Acres	1.113	120
Private Surface	U8319	1.954	412
	Columbo Fee Land	.714	560
	Federal Modification	.270	70
TOTAL		8.478	1642

The Gordon Creek mine area is badly faulted and is geologically separated by four major parallel fault zones. The major faults are interspersed with numerous related faults and with zones containing some dikes and spars.

Mining of the Gordon Creek No. 2 mine will be by room and pillar mining methods utilizing continuous miners. Three continuous miner sections will be operating two shifts per day at 375 tons per machine shift with a total estimated annual production of 522,000 tons per year. Coal will be hauled from the working face by shuttle cars and loaded onto conveyor belts to haul the coal from underground. The current operations are on the Castlegate "A" seam with 2 sections advancing towards the U8319-1 modification of 480 acres. These sections are operating in parallel, however, the northern section is operating between a fault in the south and previously abandoned workings to the north. Plans are to cut back from five entries to four entries until the current operation has passed the abandoned workings and then go back to five-entry system.

The southern section is operating between a 120-foot fault to the southwest and a 17-foot fault on the northeast, about 1,100 feet apart. It is Beaver Creek's plan to drive across 40 acres of the new 70 acre modification to reach the 480 acre modification of U8319-1. In the process, it is planned to recover 270,000 tons of coal in the Castlegate "A" seam while proceeding to the larger tract.

The Hiawatha seam is expected to be reached by driving a 1,000-foot rock tunnel on a 15 percent grade from Castlegate "A" to the Hiawatha seam. Mining of the Hiawatha is also expected to be by room and pillar methods with recovery on retreat of the pillars.

Mining in the northern portion of the LMU was attempted, but poor roof conditions were encountered. It is considered too dangerous to mine and production is not expected to occur in that section.

Coal, after it is conveyed out of the mine, is transported 25 miles to the coal preparation plant, south of Wellington. After cleaning of the coal occurs, it is loaded onto the unit trains and transported to the Mississippi Power Company in Mississippi.

Subsidence is expected to occur over the long term; this is part of the reason for the second mining of the pillars to assist in the caving of the mine. The fracturing that is associated with caving is expected to fill up the voids with broken rock and cause minimal surface subsidence.

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Currently eight surface acres have been disturbed, no waste or tailings disposal are to occur at the mine site; the cleaning of coal occurs on Fee lands. The portals, upon abandonment, will be sealed with blocks of concrete at a point where the overburden is three times the height of the entry; the remainder of the portal will be sealed with earth fill. The surface area disturbed will be regraded to the original contour where possible.

Production Capability Analysis

A major consideration in the development of a mining plan for Gordon Creek No. 2 and the subsequent operation of the mine, is the extensive faulting that has occurred in the area. This faulting has rendered certain portions of the LMU unmineable and severely limited the means of access for the remaining portions. Knowledge of the total potential impact of the faulting on recovery from the property is still limited by the lack of sufficient exploratory drilling.

Mining operations are based on 3 continuous miner shifts, 2 shifts a day, and 5 days a week. For a planned annual production of 522,000 tons, this translates into a very conservative 348 tons per continuous miner shift. Since the current Castlegate A seam operations are in rather ideal mining thicknesses of 6 to 8 feet, it is assumed that a major factor in the low continuous miner production are the effects of the faulting on the property.

The 80-foot entry and crosscut spacing used in the mine together with a 20-foot wide opening on advance, translates into a theoretical recovery in the mining areas of 44 percent. Accounting for the coal that must be left in entry and barrier pillars and adjacent to fault zone, the company plans on achieving an overall recovery rate of 50 percent with secondary mining of the coal in pillars. This is a reasonable expectation for a property with the depth of cover encountered here and where faulting precludes the use of more efficient techniques such as longwall mining.

Aproximately one half of the reserves on the LMU are located in the underlying Hiawatha seam. The plan at this time is to complete mining operations in the Castlegate A seam before any attempt is made to go after the Hiawatha coal. Since the two seams are separated by only 200 feet, it is expected that the mining conditions encountered in the lower seam will be comparable to those in the Castlegate A seam.

Coal produced from the Gordon Creek No. 2 mine must be trucked 25 miles to a newly constructed coal preparation plant owned by the company south of Wellington. Considering the fact that mainline tracks of the Denver & Rio Grande Western Railroad are located much closer to the mine than this, the 25-mile truck haul is a significant economic penalty.

The environmental impact of the mine is minimal. Surface disturbance has been limited to 8 acres, primarily for the location of surface support buildings and truck loading facilities. Subsidence of the surface is expected, especialy for those areas where the depth of cover is more shallow. Secondary mining opertions will be conducted with a view towards obtaining fairly even subsidence over the extent of the property and thereby minimizing the impact at the surface.

Diligent Development Analysis

At the present time there is no reason to suspect that the company will not be able to meet the requirements for diligent development and continuous operation for the LMU. Currently identified reserves and the expanded production rate of 522,000 tons per year equate to a remaining life of approximately 17 years. It is anticipated that the company will attempt to obtain additional lease acreage so as to increase the life of the LMU.

STATE: Utah **REGION:** Uinta **COUNTY:** Carbon

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Gordon Creek No. 2	Beaver Creek Coal Company	U 8319	1641.75	891.75 190.00 1081.75	560	U/G ①	Approved 1-24-78	0.522

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 8.478

SOURCE: USGS

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:
① Room and pillar

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah REGION: Uinta COUNTY: Carbon

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
Gordon Creek No. 2	Swisher Coal Co.	1	U/G

COAL CHARACTERISTICS:	SEAM 1 ①	SEAM 2 ②	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Castlegate A	Hiawatha						
FORMATION	Blackhawk	→						
RANK	hvBb	→						
THICKNESS	9'	6 - 9'						
Btu/LB	12,200	12,114						
SULFUR (%)	0.46	0.56						
ASH (%)	6.0	6.5						
MOISTURE (%)	7.0	7.0						
FIXED CARBON (%)	44.9	44.6						
VOLATILE (%)	44.35	41.3						
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
③	UNDERGROUND	7.764	0.714	8.478	USGS

NOTES: ① As received by Swisher Coal Co.
② An average analysis
③ 1977 estimated recoverable reserves @ 50% recovery rate

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah **REGION:** Vinta **COUNTY:** Carbon

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	
Gordon Creek	Swisher Coal Co.	1	DATE MINE OPENED: 1962 PROJECTED CLOSING DATE: 1996 REMAINING MINE LIFE: 16

REMAINING RECOVERABLE RESERVES:
FEDERAL:
NON-FEDERAL:

MINE DESIGN CAPACITY 0.522
RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979: 1.71
1979 ACTUAL PRODUCTION: 0.535 ①

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION	
1980	0.5		Lone Star Cement	0.04/yr
1981	0.5			
1982	0.5		Abbot Chemical	0.083/yr
1983	0.522			
1984	0.522			
1985	↓			
1986				
1987				
1988				
1989				
1990	0.522			
Post 1990	2.802			

NOTES:
① Keystone Coal

All Figures Shown in Million Tons

PRODUCTION SUMMARY

SAGE POINT-DUGOUT
(FISH CREEK-DUBOUT)
NATURAL GAS CORPORATION OF CALIFORNIA
MAP LOCATION U-6
FEDERAL COAL LEASES: U07746 (2,480.00 Acres)
U089096(480.00 Acres)
U092147(680.00 Acres)
U0144820(2,212.00 Acres)
U027821(2,416.14 Acres)
U0 7064(2,416.14 Acres)
UTAH STATE COAL LEASES: ML22590
ML22675
ML21994

CARBON COUNTY, UTAH

The following information was obtained from a Mining Plan submitted November 1, 1976. The Sage Point-Dugout Canyon Project is located in central Utah; Carbon County, approximately 14 miles northeast of Price, Utah.

Natural Gas Corporation of California (NGC), a California corporation qualified to do business in Utah and a wholly-owned subsidiary of Pacific Gas and Electric Company (PG&E) which supplies electricity and natural gas to Northern California customers, and Kennecott Coal Company (KCC), a wholly-owned subsidiary of Kennecott Copper Corporation (a multi-national resource producer) owns leases and in fee certain coal properties in Central, Utah, which comprises the Sage Point-Dugout Canyon project.

The Sage Point-Dugout Canyon Project is a new coal mine having a capacity of 3,200,000 tons per year (see table 1).

The coal within the property boundaries lies in the upper portion of the Blackhawk Formation of Upper Cretaceous age. There are three seams or zones of economic importance in this area (see Figures 1 and 2). They are, from

SDL-10.1(g) SCHEDULE OF PRODUCTION (SAGE POINT MINE)

6 Years Projection (Raw Coal)

Sunnyside Seam

Year	- 1 -			- 2 -			- 3 -			- 4 -			- 5 -			- 6 -		
Month	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons
Jan.					1	8,000		3	42,400		5	63,000	1	6	105,400	2	6	140,400
Feb.					1	8,000		3	42,400		5	72,000	1	6	108,900	2	6	140,400
March					1	8,000		3	44,000		5	76,000	1	6	112,400	3	6	154,400
April		Tunnel			1	11,400		3	45,600		5	80,000	1	6	114,400	3	6	157,900
May	-				1	11,400		4	49,600		5	80,000	1	6	115,900	3	6	161,400
June					1	15,200		4	53,200		5	80,000	1	6	115,900	3	6	164,900
July					2	19,000		4	57,000		5	80,000	1	6	115,900	3	6	164,900
Aug.		1	3,000		2	23,200		4	64,000		6	83,800	2	6	129,900	3	6	164,900
Sept.		1	3,500		2	27,200		4	64,000		6	87,600	2	6	133,400	3	6	164,900
Oct.		1	3,300		2	30,400		4	64,000		6	90,000	2	6	136,900	3	6	164,900
Nov.		1	3,800		2	34,400		4	64,000		6	91,200	2	6	140,400	3	6	164,900
Dec.		1	3,800		2	38,400		4	64,000		6	91,400	2	6	140,400	3	6	164,900
Total	-	①	17,800		②	230,600	-	④+①	654,000	-	⑥	980,000	②	⑥	1,469,800	③	⑥	1,908,800

ROCK CANYON SEAM

Month	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons
Jan					2	8,000		2	30,700		2	30,700		2	30,700		2	30,700
Feb.					2	11,400		2	30,700		2	30,700		2	30,700		2	30,700
March					2	11,400		2	30,700		2	30,700		2	30,700		2	30,700
April					2	13,200		2	30,700		2	30,700		2	30,700		2	30,700
May					2	19,000		2	30,700		2	30,700		2	30,700		2	30,700
June		1	3,000		2	20,900		2	30,700		2	30,700		2	30,700		2	30,700
July		1	3,800		2	24,000		2	30,700		2	30,700		2	30,700		2	30,700
Aug.		1	5,500		2	30,000		2	30,700		2	30,700		2	30,700		2	30,700
Sept.		1	12,300		2	30,000		2	30,700		2	30,700		2	30,700		2	30,700
Oct.		1	15,800		2	30,000		2	30,700		2	30,700		2	30,700		2	30,700
Nov.		1	15,800		2	30,000		2	30,700		2	30,700		2	30,700		2	30,700
Dec,		1	15,800		2	30,000		2	30,700		2	30,700		2	30,700		2	30,700
Total	-	①	72,000	-	2	257,000	-	2+1*	368,000	-	2	368,000	-	2	368,000	-	2	368,000
Total Mine		②	89,300		④	437,600		⑥+2*	1,023,000		⑧	1,348,000	②	⑧	1,337,000	-	⑧	2,276,300

L.W.-Longwall mining
C.M.-Continuous mining

*Spare Unit

Equipment= 8 continuous miner operating + ③ C.M. spare
= 3 longwalls operating

SDL-10.1(h) SCHEDULE OF PRODUCTION (DUGOUT CANYON MINE)

6 Years Projection (Raw Coal)

Rock Canyon Seam

Year	- 1 -			- 2 -			- 3 -			- 4 -			- 5 -			- 6 -		
Month	L.W.[1]	C.M.[2]	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons
Jan					1	8,000		1	14,000		2	17,800	1	3	59,000	1	3	69,000
Feb.					1	8,000		1	14,000		2	28,000	1	3	62,000	1	3	69,000
March		Surface facility			1	8,000		1	14,000		3	31,000	1	3	66,000	1	3	69,000
April					1	11,400		1	14,000		3	31,000	1	3	68,000	1	3	69,000
May					1	11,400		1	14,000		3	44,000	1	3	69,000	1	3	69,000
June		1	3,000		1	14,000		1	14,000		3	45,000	1	3	69,000	1	3	69,000
July		1	3,500		1	14,000		1	14,000		3	45,000	1	3	69,000	1	3	69,000
Aug.		1	3,500		1	14,000		1	14,000		3	45,000	1	3	69,000	1	3	69,000
Sept.		1	3,800		1	14,000		1	14,000		3	45,000	1	3	69,000	1	3	69,000
Oct.		1	3,800		1	14,000		1	14,000		3	45,000	1	3	69,000	1	3	69,000
Nov.		1	3,800		1	14,000		2	17,000		3	45,000	1	3	69,000	1	3	69,000
Dec.		1	3,800		1	14,000		2	17,000		3	45,000	1	3	69,000	1	3	69,000
Total	-	①	25,200	-	①	144,800	-	②	174,000	-	①	466,800	①	③	807,000	①	③	828,000

Gilson Seam

Month	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons	L.W.	C.M.	Tons
Jan																	1	3,800
Feb.																	1	3,800
March														Surface facility			1	6,000
April																	1	6,000
May																	1	6,000
June																	1	8,000
July																	1	8,000
Aug.																	1	8,000
Sept.														1	3,000		1	12,000
Oct.														1	3,000		1	12,000
Nov.														1	3,000		1	14,000
Dec.														1			1	14,000
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	①	9,000	-	①	89,600
Total Mine	-	①	25,000	-	①	144,800	-	②	174,000	-	③	466,800	①	④	816,000	1	④	917,600
Total-	-	③	114,300		⑤	582,400		⑧ + ② SP	1,197,000		⑪	1,814,800	③	⑫	2,153,000	4	⑫	3,193,900

Sage Point - Dugout Canyon Mine

② C.M.=Continous mining. ① L.W.=Longwall mining 1 Total unit 14 C.M. + 3 L.W.

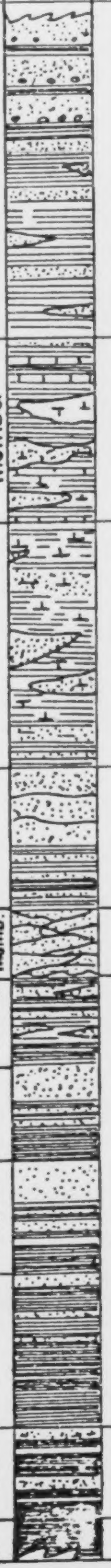
409

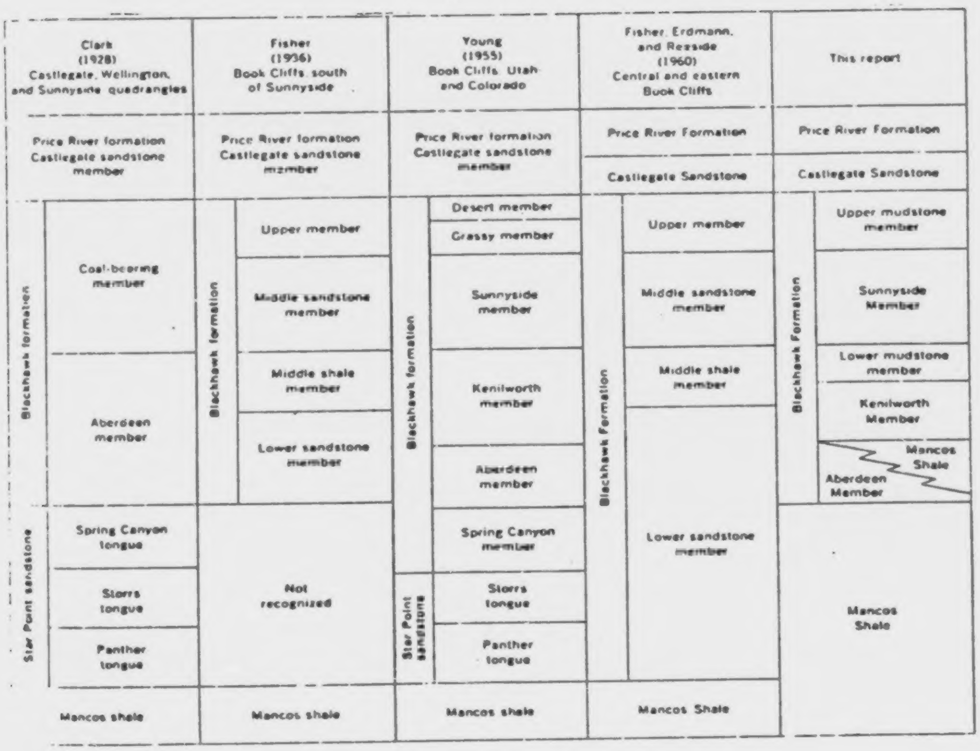
2.
410

STRATIGRAPHIC SECTION
SAGE POINT-DUGOUT CANYON PROJECT, CARBON CO., UTAH

P.B. Anderson, geologist

7.3(b)

System	Series	Stratigraphic Unit	Lithology	Thickness	Description
TERTIARY	Eocene	Colton Formation		842'	Red and some gray-green shales interbedded with light gray to greenish coarse to fine grained lenticular sandstones. Basal grit and pebble conglomerates in sandstones. Forms the Roan Cliffs.
	? Paleocene	Green River Formation Flagstaff Member		463'	Interbedded gray-green to red variegated shales, light gray to green medium grained lenticular sandstones and thin beds of freshwater limestones. Forms resistant dip slope.
CRETACEOUS	Danian Maestrichthian	North Horn Formation		620'	Interbedded gray, gray-green, purple, to yellow-tan calcareous shales, light tan to cream marls with small limestone nodules, and light gray coarse to fine grained lenticular channel sandstones up to 40 feet in thickness.
		Mesaverede Group Price River Formation		351'	Upper sandstone--gray to light gray medium grained sandstones, with thin beds of silts, shales and carbonaceous shales, cliff former. Middle portion--light gray to tan medium to fine grain ss. interbed. with shales and silty shales.
	Campanian	Castle gate Memb.		172'	Gray, medium grained sandstone, with some thin lenses of carbonaceous shale, cliff former.
		Blackhawk Formation Coal bearing Kenilworth Aberdeen Tongues Spring Canyon		1148'	Coal Bearing--Interbedded light gray, medium to fine grain sandstones, siltstones, gray to carbonaceous shales and coal. Lower Portion--gray littoral, medium to very fine grained bioturbated sandstones and sandy siltstones with tongues of Mancos shale in between the major littoral tongues (thickness of tongues not to scale).
		Star Point SS		229'	Gray sandy siltstone tongues in the gray shale. Last remains of the Storrs and Panther tongues, non-resistant.
		Masuk Tongue Mancos Shale			Gray to drk. gray, marine shale, calcareous and gypsiferous, slope former.


Clark (1928) Castlegate, Wellington, and Sunnyside quadrangles
Fisher (1936) Book Cliffs south of Sunnyside
Young (1955) Book Cliffs, Utah and Colorado
Fisher, Erdmann, and Reeside (1960) Central and eastern Book Cliffs
This report
Price River formation Castlegate sandstone member
Price River formation Castlegate sandstone member
Price River formation Castlegate sandstone member
Price River Formation
Castlegate Sandstone
Price River Formation
Castlegate Sandstone
Blackhawk formation
Coal-bearing member
Aberdeen member
Star Point sandstone
Spring Canyon tongue
Storrs tongue
Panther tongue
Mancos shale
Blackhawk formation
Upper member
Middle sandstone member
Middle shale member
Lower sandstone member
Not recognized
Mancos shale
Blackhawk formation
Desert member
Grassy member
Sunnyside member
Kenilworth member
Aberdeen member
Spring Canyon member
Star Point sandstone
Storrs tongue
Panther tongue
Mancos shale
Blackhawk Formation
Upper member
Middle sandstone member
Middle shale member
Lower sandstone member
Mancos Shale
Blackhawk Formation
Upper mudstone member
Sunnyside Member
Lower mudstone member
Kenilworth Member
Mancos Shale
Aberdeen Member
Mancos Shale

bottom to top, the Gilson, Rock Canyon and Sunnyside. All three seams are never everywhere mineable showing lenticularity typical of Mesaverde coals.

Starting at the base of the coal-bearing section, the top of the Kenilworth Member, the first correlatable coal is the enilworth. This coal is typically about two feet thick along the outcrop and thinning to less than a foot in the subsurface to the north. In the outcrop, the Kenilworth coal is about 20 feet above the top of the beach deposits of the Kenilworth Member. This coal never attains mineable thicknesses on the property.

The Gilson coal is the next coal in the section and is mineable in most places on the property. There are one or two coals in the 40-foot interval above the Kenilworth coal but the coals are usually less than one-foot thick and difficult to correlate. The Gilson seam follows the typical pattern for a fluvial-type coal. It is lenticular and problematic in its correlation from hole to hole. Its thickness varies in the formation.

The Rock Canyon seam lies at the top of the previously discussed interval. The Rock Canyon bed is presently mined by California Portland Cement Company in the Soldier Canyon mine immediately west of Sage Point in secs. 7 and 19, T. 13 S., R 12 E. On the Sage Point-Dugout Canyon property the seam varies in thickness showing lenticularity with some splitting and rock partings.

Continuity appears to be better in this seam than both the Gilson and Sunnyside seams. Preliminary data from outcrop work by John Balsley (oral communication and unpublished data, 1976) indicates that the Rock Canyon seam is a transgressive coal from sections measured in Soldier Canyon, Fish Creek and Dugout Canyon.

The coal that lies atop the tongue in the Sunnyside area is of coking quality and fairly continuous in its stratigraphic position. In the area of Soldier Canyon there is one-half foot of coal lying five feet above the lower tongue, but this is not present in the Fish Creek area. This is the only true Sunnyside coal.

The Sunnyside coal zone is thin on the south, where it outcrops, and is made up of one to three coal beds.

The structure is very simple on a large-scale basis. The beds generally strike about N. 80° W and have dips of about 7° N. with minor variations. Small undulations in structure, such as rolls, are expected to be encountered in mining. This is common in coals due to the paleogeography and differential compaction of the varied types of sediment between coals.

Faults are not known to be located in the area of calculated reserves that have displacements sufficient to cause any major difficulties in extraction of the coal. The only fault found with a displacement graater than one foot was in the mouth of Fish Creek Canyon. The maximum displacement observed was two feet, with a 1.8 foot brecciated zone filled with sandstone and large calcite crystals. The wide brecciated zone was traceable for about 200-300 feet along the strike. The stike of the fault was N. 83 W., which nearly parallels the strike of the beds. The fault is probably related to slumping or the breaking away of large blocks of sediment from the cliff face as the softer Mancos is eroded out from under it.

There are two faults lying to the northeast of the property which were taken from Doelling's map (1972, p. 396). These faults lie in the Roan Cliffs north of any mineable reserves.

Seventeen measurements of fractures have been taken on rocks throughout the stratigraphic section in different areas of the property. The dips of all the fractures were within 5° of vertical with the exception of one which dipped 60° to the south.

Mineable coal occurs in seams: the upper, Sunnyside; the middle, Rock Canyon; and the lowest, Gilson. As a result of drilling by NGC and KCC, in-place reserves of 222,000,000 tons have been defined. NGC reserves 142,000,000 tons and KCC reserves 80,000,000 tons. The logs of all drilled holes have been furnished to the U.S. Geological Survey.

Incomplete data from 5 KCC drill holes indicate high sulfur in coal from the Rock Canyon seam. In actual mining, this coal would not be mixed with other coals of the Sage Point-Dugout Canyon Mine that are to be washed. Sunnyside and Gilson seam coals of KCC appear comparable in sulfur content with Sage Point coals.

Plans call for washing run-of-mine coal by gravity separation. Quality of coal should be upgraded by nearly 10 percent. Rejects will be stockpiled behind storage dams and the washery water system will be a closed one.

Sage Point-Dugout Canyon coal has minor coking quality. Coal will be used by PG & E for electric generation in California and for KCC's use in Utah and Nevada.

The Sage Point-Dugout Canyon Project is the combination of two mines, the Fish Creek mine and the Dugout Canyon mine. The mining methods planned are similar for both mines. For this reason the Mining Plan is combined in a single report covering both mines. The only difference is that the Sunnyside seam may not be mineable in the Dugout Canyon mine.

The proposed mining methods planned for Sage Point-Dugout Canyon Project are a combination of continuous miners for main, butt and panel development and longwall methods for panel extraction.

Except under limited conditions, coal will be mined to a minimum thickness of 4.5 feet.

Room and pillar system and pillar splits will be used where the coal depths are less than 2,000 feet. By pillar splits, coal can be extracted in a range of 60 to 80 percent. In a few areas where it will be necessary to protect a surface pipeline and cliffs, the extraction will be less than 50 percent.

In all room and pillar systems, coal is mined by continuous mining machine then hauled by shuttle cars from the continuous miner to a breaker-feeder that reduces lumps to easily handled size and is transported to surface over one or more conveyor belts.

In the room and pillar systems there will be two methods of mining. In the case where panels will be advanced along the seam pitch, the rooms will be mined on both sides of the panel and along the strike. If the panels are advanced along seam strike, the rooms will be mined only on the pitch side of the panels.

Longwall mining is a continuous method. The block or panel of coal to be mined, usually 300 to 600 feet wide by 2,500 to 6,000 feet long, is first developed by driving entries on all four sides of the block. Preliminary planning specifies three entries for longwall panels, but in the future, if the conditions of mining require less, they may go to two or even single-entry panels.

The seam thicknesses planned for longwall are 4.5 to 10.0 feet.

At Sage Point-Dugout Canyon Project, the longwall system is planned to be mined on the retreat. However, in some areas there will be an alternating system, advancing and retreating. By using the alternating system, time is saved in transporting longwall equipment at the completion of each panel.

More than 90 percent of longwall panels are planned so that their faces are along the pitch. Within the northwest part of the property the face will be along the strike. In this last case the extraction of the panel will be from lower to higher elevation to keep the water flow away from the face.

All the coal in the Sage Point-Dugout Canyon Project will be transported by means of belt and cable conveyors.

On panels and rooms, 2,000-foot conveyors will be used. On the longwall panels, 4,000 and 2,000-foot belt conveyors will be used.

In the longwall face the coal will be transported by a single-chain conveyor which will dump the coal on a stage-chain conveyor installed at the headgate. The stage conveyor will be equipped with coal breaker and will dump coal on the panel conveyor.

The overland belts will be 48 inches wide equipped with a protective cover.

STATE: Utah **REGION:** Uinta **COUNTY:** Carbon

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Sage Point - Dugout	Natural Gas Corporation of California	U07746	10,044	2,480.00	1776	U/G	INCOMPLETE M.P.	3.2
		U089096		480.00				
		U092147		680.00				
		U0144820		2,212.00				
		U027821		2,416.14				
		U0 7064		2,416.14				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 222.0

RECOVERABLE: 111.0

SOURCE: EIS

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah
REGION: Uinta
COUNTY: Carbon

MINE NAME (OR LEASE BLOCK): Sage Point - Dugout
LESSEE(S) (OR OPERATOR): Natural Gas Corp. of California
NUMBER OF LEASES IN BLOCK OR PLAN: 6
MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Gilson	Rock Canyon	Sunnyside					
FORMATION	Blackhawk	→	→					
RANK								
THICKNESS	<4'->16'	<4'-10.5'	<4'->12'					
Btu/LB								
SULFUR (%)								
ASH (%)								
MOISTURE (%)								
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			222.0	EIS
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			111.0	EIS

NOTES:

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah
REGION: Vinta
COUNTY: Carbon

MINE NAME OR LEASE BLOCK: Sage Point-Dugout
LESSEE(S): Natural Gas Corp. of California
NUMBER OF LEASES: 6
DATE MINE OPENED: 1984
PROJECTED CLOSING DATE: 2024
REMAINING MINE LIFE: 40

REMAINING RECOVERABLE RESERVES:
FEDERAL:
NON-FEDERAL:
MINE DESIGN CAPACITY: 3.2
RECOVERY RATE: 60-80①
CUMULATIVE PRODUCTION TO 1979: 0.3
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983			
1984	0.12		
1985	0.63		
1986	1.0		
1987	1.2		
1988	1.6		
1989	2.0		
1990	2.65		
Post 1990	101.8		

NOTES: ① In selected areas, the recovery rate will be less than 50%

All Figures Shown in Million Tons

PRODUCTION SUMMARY

24A, #1

SOLDIER CANYON MINE
CALIFORNIA PORTLAND CEMENT COMPANY
MAP LOCATION U- 6
FEDERAL COAL LEASE SL051279 (1548.31 acres)
CARBON COUNTY, UTAH

The Soldier Canyon LMU is comprised of the above Federal lease totaling 1548.31 acres. The mine is located 12 miles northwest of Wellington, Utah and lies in an area of steep slopes along the Book Cliffs. All of the coal rights were obtained from the Federal government, however, surface ownership is divided among the Federal government and two residents of Price, Utah.

The commerical coal seams of Soldier Canyon mine are part of a group of sedimentary rock units known as the Book Cliffs coal field of central Utah. These units (consisting largely of sandstones, shales, carbonaceous shales, calcareous shale, and coal beds) were laid down as broad, shallow sea deposits during the late Mesozoic Era (Upper Cretaceous). Rocks in this area strike west and dip about 6° N. There are no known faults on the lands under lease.

Three beds, the Lower Sunnyside, the Rock Canyon, and the Gilson (in descending order), are known to be valuable on the leasehold. Another bed, the Kenilworth, lying below these beds, is less than three feet thick in each of three test holes drilled on the leasehold. Mining has been in only the Rock Canyon bed.

The area's known coal seams and respective rock interburden are listed below in descending stratigraphic order.

	Feet
Castlegate Sandstone	
Coal beds above Upper Sunnyside	0-3
Upper Sunnyside Bed	0-6

	Feet
Total interval above Lower Sunnyside to base of Castlegate Sandstone	175-250
Lower Sunnyside Bed	1-9
Interval	55-180
Rock Canyon Bed	1-9
Interval	50
Fish Creek Bed	0.8-5.2
Interval	25-60
Gilson Bed	1-13

Some variation in seam thickness due to pinching and swelling, and an apparent general thickening trend to the north are found. Coal reserves have been explored by drilling along the common sec. line 7-8 and by trenching along outcrops. Relatively little is known of reserves lying north and west of present workings; however, the Sunnyside and Gilson seams are more attrative in the northern area of the property as they thicken. Drilling from the Rock Canyon seam will explore the coal for possible future mining.

The Gilson coal seam, except for a few areas that have eroded, underlies the entire leasehold, with an average thickness of about six feet. The Rock Canyon bed, with an average thickness of about 9 feet, did underlie all of the area but has been mined in approximately 260 acres and eroded from about 40 acres. The Lower Sunnyside bed probably underlies all of the leasehold but it is less than four feet thick in the southern half of the area.

Depths of the coal bed are less than 1,500 feet over almost all of the leasehold. Depths under about 160 acres range between 1,500 feet and 1,800 feet.

The total in-place coal reserves on the lease are estimated to be 24,625,000 tons.

The Rock Canyon seam is the only seam on the lease that has a known analysis of the coal. Twenty-eight samples were analyzed, yielding an average as-received quality of:

Moisture	7.45%
Ash	11.87%
Sulfur	0.5%
Btu/lb	11,399
Volatile Matter	36.63%
Fixed Carbon	44.05%

The Soldier Canyon Coal mine operates in the Rock Canyon seam through a portal located on the west side of Soldier Canyon in the NE 1/4 sec. 18. Mine workings lie north and west of the portal and cover about 250 acres. Pillar extraction has been implemented only in a portion of the NW 1/4, NW 1/4, sec. 18.

The coal seam in the new working areas is being extracted to the full thickness of the seam (9 to 11 feet). The mine plan has changed due to extensive burning of the seam, and will be modified continuously until the mine workings are away from the outcrop area. Conventional units, supplemented by continuous miners, will be used in the initial development. No second mining will be allowed until the upper seam (Upper Sunnyside) has been mined out.

The mine was developed by driving the main entries down dip and the panel entries along the strike.(1) The rooms are the driven downdip from the panel entries.

Soldier Canyon has made a minor modification to the mine plan and has reduced the pillar sizes on the Main East Section. Development entries are being reduced to 80-foot centers and the same with the cross cut centers, this was allowed due to a ligher overburden in the area.

When coal is removed from the face, it is emptied from the continuous miner into a shuttle car and transported to a breaker-feeder which loads the coal onto a belt haulage system for transporting of the coal from the mine. Once out of the mine, coal is loaded into a 600-ton automatic truck loading bin; when the bin is full, coal is moved to a 5,000-ton open storage area. Coal can be recovered from the open storage area to be loaded onto waiting railroad cars (not necessarily unit trains) for shipment to one of four cement plants.

Geologic hazards identified in the mine area include the possibility of roof falls, water flooding, subsidence, sloughing of the Book Cliffs where mining is close to the outcrop, and methane seepage. The Soldier Canyon mine is considered the second largest methane-producing mine in the area. Because of the methane, the continuous miners must remove the coal in four lifts, each about five-feet by ten-feet in size.

Production from the Soldier Canyon mine, as indicated by the Coal Age article, was 624,500 tons in 1979 from the Rock Canyon seam. Production from June, 1976 through January, 1980 has been indicated to be 1,900,000 tons.(1)

The Rock Canyon seam is currently being mined under a five year plan. The Lower Sunnyside seam, after being explored, may be mined. Access to this stratigraphically higher seam is to be attained by use of a rock slope. The Gilson seam is to be explored, but not mined until the upper two seams have been mined.

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(1) Coal Age, September, 1980, pages 109-117

Production Capability Analysis

The Soldier Canyon mine is presently laid out as a standard room and pillar operation. Part of the mine, those portions under deeper cover, is laid out with entries and crosscuts on 100-foot centers and the remainder of the mine is on 80-foot centers. With 20-foot wide entries and crosscuts, the maximum theoretical recovery rates for these two pillar spacings is 36 and 44 percent, respectively. With partial or complete recovery of the coal in the pillars, both of these recovery rates could be increased significantly. For present purposes, it is assumed that the overall recovery rate in the mine will be 50 percent if the barrier pillars are left in place and part of the pillars in the mined out portions are recovered.

Current production estimates are based on the operation of 3 headings per shift, 2 shifts per day, 5 days per week. Assumng a conservative production of 500 tons per heading per shift, this gives an annual mine production of 720,000 tons. This estimate is within 5 percent of the 750,000 ton-per-year rate given in ACLDS. Either rate is easily obtainable with the present equipment in the mine.

Mining operations are made more difficult and costly by the need to mine down dip at an angle of approximately 7 degrees. The effect of this on mining operations has been minimized by the use of diesel transport equipment underground in the place of the more traditional electrically powered equipment. The use of diesel equipment has also served to minimize the impact of a one-way portal to face transport distance of over 2 miles.

Factors such as reasonably thick coal, 9 to 11 feet, and better than average floor and back conditions indicate that the Soldier Canyon mine should not have any difficulty maintaining its designed production rate. There has been some problem with methane gas but the company has adjusted mining operations to allow for maximum venting of the gas from the coal at the operating headings and plenty of ventilation capacity to move the methane out of the mine.

There is an unspecified intention to begin mining in the overlying Lower Sunnyside seam when the coal in the currently mined Rock Canyon seam is depleted. It is planned to do exploratory diamond drilling of both the Lower Sunnyside seam and the underlying Gilson seam as mining operations in the Rock Canyon seam progress. Any reserves attributed to either one of the yet unmined seams can only be considered as speculative until this drilling data has been obtained and evaluated. However, special care should be taken during the mining of the Rock Canyon seam to ensure that subsidence caused by pillar recovery or other operations does not make the Lower Sunnyside seam unmineable.

Impact on the surface environmental conditions is minimal. The company currently lists its total disturbed surface acreage as being less than 14 acres. This acreage is devoted for the most part to various mine support buildings and a truck loadout facility. It is the company's intention to remove all of these facilities, seal the mine openings, return the land to its original contours, and revegetate it when mining operations have been completed.

Coal from the mine is trucked by 40-ton tandem trucks 18 miles to a rail loadout facility. Storage capacity at the mine consist of a 600-ton automatic loading bin and 5,000 tons of open storage when the bin is full. The railroad loading facility provides for 500,000 tons of open storage where coal can be directly reclaimed from the stockpile and loaded into rail cars at a rate of 3,000 tons per hour. Since the typical train load to one of 4 cement plants is only 2,000 tons, these facilities are more than adequate.

Diligent Development Analysis

The current in-place reserves are given as 24,625,000 tons. Assuming a 50-percent recovery rate as discussed above, the 2 1/2 percent diligence requirement would be approximately 307,800 tons of coal per year. With its projected maximum production rate of 720,000 tons per year the company exceeds diligence requirements by more than a factor of two.

Since the Soldier Canyon mine is for the most part a captive supplier of coal to 4 large cement plants, there is no reason to assume that the mine will not continue to meet the requirements for diligence and continuous operation. The only question at this point in time is to the magnitude of the economically recoverable reserves in the Lower Sunnyside and Gilson seams and as to whether the company will choose to mine coal from these seams.

STATE: Utah **REGION:** Vinta **COUNTY:** Carbon

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Soldier Canyon Mine	California Portland cement Co.	SL 051279	1548.31	1548.31		U/G	Approved 11-14-75	0.750

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 24.625

RECOVERABLE: 12.31

SOURCE: Coal Age

ASSOCIATED LEASES WITH REASONS WHY:

All Figures Shown In Million Tons

COMMENTS:

Applied for 2214 acres containing 41.00 tons proven
23.00 tons possible
64.00 tons total

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah REGION: Uinta COUNTY: Carbon

MINE NAME (OR LEASE BLOCK): Soldier Canyon Mine

LESSEE(S) (OR OPERATOR): California Portland Cement Co.

NUMBER OF LEASES IN BLOCK OR PLAN: 1

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	L. Sunnyside	Rock Canyon	Gilson					
FORMATION	Blackhawk	→	→					
RANK		Bit						
THICKNESS	1'-9'	1'-9'	1'-13'					
Btu/LB	13,590 ①	11,399	13,250 ①					
SULFUR (%)	1.0	0.5	0.4					
ASH (%)	7.2	11.8	7.5					
MOISTURE (%)	4.5	7.5	4.6					
FIXED CARBON (%)	52.6	44.0	51.9					
VOLATILE (%)	40.1	36.6	40.4					
SEAM DEPTH ②								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			24.625	Coal Age
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			12.31	

NOTES: Mining only Rock Canyon Seam
① Keystone 1980 "US Coal Mine production by seam": Mean analysis:

Proven Reserves 24.625
Additional " 21.435
Total " 46.060

② Depth < 1500' except for 160 acres where depth is 1500'-1800'

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah **REGION:** Uinta **COUNTY:** Carbon

MINE NAME OR LEASE BLOCK: Soldier Canyon Mine

LESSEE(S): California Portland Cement Co.

NUMBER OF LEASES: 1

DATE MINE OPENED: 1976

PROJECTED CLOSING DATE: 1991

REMAINING MINE LIFE: 11

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY 0.750

RECOVERY RATE: 45 ①

CUMULATIVE PRODUCTION TO 1979: 1.9

1979 ACTUAL PRODUCTION: 0.6245 ②

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990			
Post 1990			

NOTES: Room & Pillar - Extract pillars upon retreat
Mining of Sunnyside and Gilson beds depends on exploration program.
① May vary from 36% to 50% depending upon pillar recovery
② Coal Age - Sept. 1980

All Figures Shown in Million Tons

PRODUCTION SUMMARY

4A, #3

430

SUNNYSIDE NO. 1, 2, and 3
KAISER STEEL CORPORATION
MAP LOCATION U- 7
FEDERAL COAL LEASES: SL062966 (1366.89 Acres)
U32083 (476.41 Acres)
AND PORTIONS OF (U.S. Steel
Corporations SL068754 and State Lease
U01215 Totaling 70.25 Acres)
CARBON COUNTY, UTAH

The Sunnyside mines are located approximately 1 mile north of the town of Sunnyside, Utah and about 23 miles east of Price, Utah. The portals are approximately one and one half miles northeast of the Book Cliffs escarpment. The total area included in the mining area is about 7031 acres. The total Federal acreage leased is 1843.30 acres for the Sunnyside No. 1, 2 and 3 mines. Also included in the mine are 70.25 acres from the U.S. Steel Corporation's Federal Lease SL068754 and their State lease U01215. The U.S. Steel acreage was exchanged for rights on 120.57 acres from Kaiser Steel's U039706 lease.

The coal in the Sunnyside area is mined from the Upper and Lower Sunnyside seams in the Blackhawk Formation, a part of the Mesaverde Group of Late Cretaceous age. The two seams are probably splits of one major bed. Another coal bed (Gilson coal) is present about 280 feet below the Lower Sunnyside seam.

In the northern part of the Sunnyside district the beds strike northwest (parallel to the Book Cliffs) and dip gently to the northeast at 5° - 15°, mostly less than 10°. Faulting does not occur on the surface of the leased tracts and would probably be of minor displacements if it occurs in the sub-surface. Minor northeast-trending faults occur farther to the south in the Sunnyside mines, but their maximum throw does not generally exceed 30 feet.

Fourteen miles northwest of the town of Sunnyside, Kaiser Steel leased two Federal coal leases, U039706 (2559.16 acres) and U02785 (2360.0 acres), these make up a portion of what is called the North Lease. To this date, Kaiser has only been in the exploration stage for the lease area. Any development of this area would be after the 1991 time frame.

Approximately 20 miles to the south-southeast of the town of Sunnyside, Kaiser holds another set of leases, referred to as the South Lease. This tract is comprised of six Federal leases and two Utah State leases totaling 8931.31 acres. The South Lease is currently in the exploration stages and again development in the near future is not likely. The prospects for possible 1991 development depends upon how complete the mine plan is how long it will be held up by the Federal Government and other agencies.

Most coal produced from the Sunnyside mine is used as coke in the Kaiser Steel Plant in Fontana, California. A production rate of 1 million tons per year is based on the assumption that the Kaiser Fontana plant stays in operation. Some Sunnyside coal is sold to other consumers to keep production levels constant. Sunnyside coal is shipped vial D&RW railroad in 8,000-ton unit-trains about two times per week.

Coal from the Sunnyside mine is ranked as high-volatile A to B bituminous, marginal coking coal. Analysis of the coal received from recent analyses from various mining blocks indicate the following quality data:

	Upper Sunnyside	Lower Sunnyside	Average of Four Blocks
Moisture	-	4.9	
Ash	5.09	6.9	
Sulfur	1.79	0.89	
Btu/lb	13,994	12,900	
Thickness (ft)	5-10	6.0 - 11.0	

Total LMU reserves in-place have been measured at approximately 40,000,000 tons. With a planned production rate of 1,000,000 tons per year, the mine could operate at least 20 more years assuming a 50 percent recovery rate. As 70 percent of the current production is coming from the long-wall operations, the mine life could be extended with a greater production rate and a higher recovery rate. The coal in-place is presumed to be greater than the above figure, but the quantity would be comprised of indicated and inferred reserves, including reserves that are beyond a reasonable mining depth. This planned production rate of 1 million-tons-per-year has not been subject to an analysis of the economic feasibility of reaching marginal areas. Production could be lower if these areas prove to be too costly to mine.

The continuous mining sections of the Sunnyside mine make up approximately 30 percent of the production coming from the mine. The continuous miners are also utilized to develop the intake and return air courses and panel development for the longwall operations.

Mining in the Sunnyside area has shown that the roof, floor, and interburden rocks with the Upper and Lower Sunnyside coals occur mostly as a complex of thin, lenticular beds of sandstone, shale, claystone, and coal, with each lithology differing widely from the others in its ultimate strength and shear failure limit.

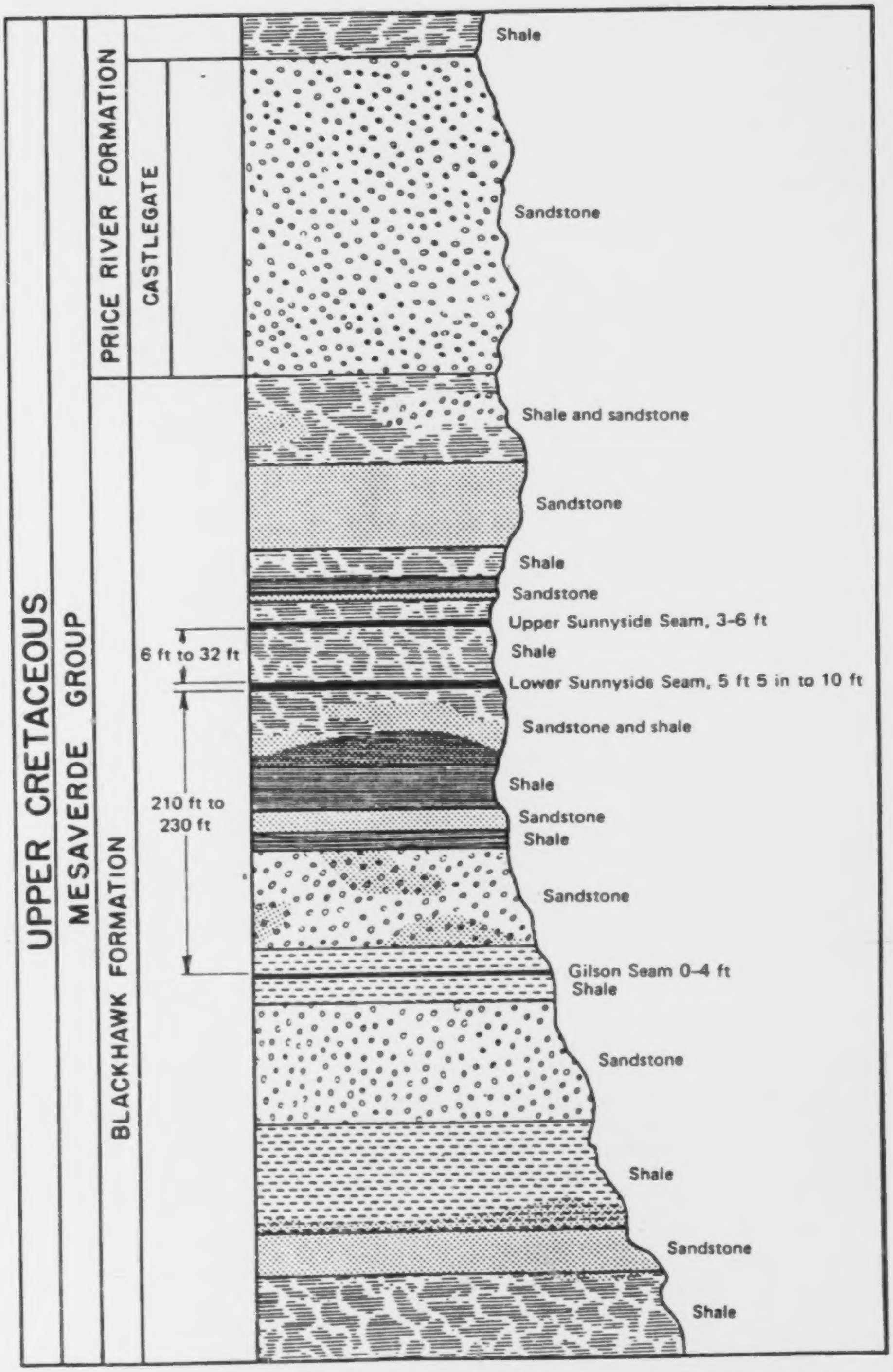

UPPER CRETACEOUS
MESAVERDE GROUP
PRICE RIVER FORMATION
CASTLEGATE
BLACKHAWK FORMATION
6 ft to 32 ft
210 ft to 230 ft
Shale
Sandstone
Shale and sandstone
Sandstone
Shale
Sandstone
Upper Sunnyside Seam, 3-6 ft
Shale
Lower Sunnyside Seam, 5 ft 5 in to 10 ft
Sandstone and shale
Shale
Sandstone
Shale
Sandstone
Gilson Seam 0–4 ft
Shale
Sandstone
Shale
Sandstone
Shale

FIGURE .--Sketch showing age and sequence of rock units in the B Canyon property area.

Production Capability Analysis

The Sunnyside mines are presently equipped with 3 longwall mining units, 7 continuous miners, and associated production equipment. Depending upon the number of shifts per day the mine is in operation, this amount of mining equipment is sufficient to support a production rate several times the 1 million-ton-per-year rate currently being achieved by Kaiser. For example, assuming 1000 and 500 tons-per-shift production rates for the longwall units and the continuous miners, respectively, and a 2 shift-per-day and 5 day-per-week operation; the equipment at the Sunnyside would support a 3.25 million-ton-year operation rate. The mines current capacity and operating rate are set by the requirements of a captive operation and its union contract.

One advantage of having extra production equipment in a large, multiple-portal operation like the Sunnyside is that it allows for more flexibility in scheduling the day-to-day operations in a difficult mining conditions in the older mine workings. The principal disadvantage is that none of the equipment is being used to its maximum capability and as a result the capital charges per unit of productin will be higher. It appears that the company is willing to accept the higher cost approach. Other evidence to support this hypothesis is that the current 425 employee manning level at the mines translates into approximately a 20 ton-per-man-shift productivity ratio. Although this figure is above the national average of 8.7 tons per man shift, it is well below the 15 to 25 tons-per-man-shift productivity being achieved by some non-union Utah underground coal producers. Kaiser's productivity rate is, however, higher than several other large underground operations in Utah.

Even though the coal produced at the Sunnyside mines must be relatively high in cost, the fact that it is a captive operation producing coking coals for Kaiser's Fontana steel works means that the coal is going to be produced. Given the 50 million tons of in-place reserves and an overall mine recovery rate on the order of 65 to 70 percent, the recoverable reserves available are in the range of 26 to 28 million tons including some marginally recoverable reserves under deep cover down dip from the existing mine operations. Unless Kaiser becomes active in the metallurgical coal market, it can be anticipated that the production rate at the Sunnyside LMU will remain at the present 1 million-ton-per-year rate. Therefore, the remaining life of the LMU will be on the order of 26 to 28 years.

The average mineable seam thickness in the Upper Sunnyside seam is 6.1 feet and that in the lower seam is 8.4 feet. Both these dimensions are well within the capability of current longwall technology. The above average competency of the roof and floor rocks indicate that there should be no difficulty with roof support. Although, the above average depth of cover, which is approximately 2500 feet, means that the longwall props, cribbing and other support facilities must be designed to support the higher loads.

As is typical of underground mines, there are limited surface facilities to impact on the environment. The existing surface facilities include the mine buildings, access roads, and a conveyor system linking the underground coal conveyors with a unit train loadout facility. The bulk of these facilities are located on private land. The company intends on removing all surface structures and reclaiming the land to its original state when the mines reach the end of their useful lives.

The coal produced from the mines is transported by unit train from the minesite to the Fontana steel making complex in southern California. The 1 million-ton-per-year production rate requires the loading and dispatching of a unit train 2 to 3 times per week. This transportation arrangement should remain adequate over the lives of the mines.

Diligent Development Analysis

The current production rate for the Sunnyside LMU and past production of the mine are more than adequate to meet the requirement for diligent development and continuous operation. The mine is not continuous to Kaiser's other lease holdings in the area so that production at the Sunnyside mine cannot be credited towrds meeting diligence on these leases by combining them into a single L.M.U. under current LMU definition.

STATE: UTAH **REGION:** UINTA **COUNTY:** CARBON

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
SUNNYSIDE NOS. 1, 2, 3	KAISER STEEL CORP.	SL062966		1286.89				
		U32083	7031	476.41	5744	U.G.	Approved 1-23-78	1.0
		(1) { SL068754		70.25				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 20.0

SOURCE: M.P.

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS: (1) SL068754 IS IN AN LEASE EXCHANGE WITH U.S. STEEL CORP.

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: UTAH REGION: UINTA COUNTY: CARBON

MINE NAME (OR LEASE BLOCK): SUNNYSIDE NOS. 1,2,3

LESSEE(S) (OR OPERATOR): KAISER STEEL CORP

NUMBER OF LEASES IN BLOCK OR PLAN: 2

MINING METHOD: U.G.

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Upper Sunnyside	Lower Sunnyside						
FORMATION	BLACKHAWK	BLACKHAWK						
RANK	hv A-B b							
THICKNESS	6.1	8.4						
Btu/LB	13043	13590(1)						
SULFUR (%)	1.3	1.0						
ASH (%)	6.9	7.2						
MOISTURE (%)	3.4	4.5						
FIXED CARBON (%)	51.6	52.6						
VOLATILE (%)	37.9	40.1						
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			40	M. P.
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			20.0	M. P.

NOTES: (1) KEYSTONE COAL "U.S. COAL MINE PRODUCTION BY SEAM", 1980 – MEAN ANALYSIS OF RAW COAL

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: UTAH REGION: UINTA COUNTY: CARBON

MINE NAME OR LEASE BLOCK: SUNNYSIDE Nos 1,2,3

LESSEE(S): KAISER STEEL CORP

NUMBER OF LEASES: 2

DATE MINE OPENED: 1978

PROJECTED CLOSING DATE: 2000

REMAINING MINE LIFE: 20

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY 1.0

RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION: 1.0

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	1.0	0.318	
1981			CAPTIVE - KAISER STEEL
1982			TO FONTANA CALIF.
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990	1.0	0.318	
Post 1990	11.0	3.498	

NOTES:

MOST OF PRODUCTION FROM FEE LAND

70% LW.

30% CONTINUOUS MINERS

Numerous FAULTS, PREVIOUS MINING AND A DIP OF 10%

All Figures Shown In Million Tons

PRODUCTION SUMMARY

BELINA NO. 1 MINE
VALLEY CAMP COAL COMPANY
MAP LOCATION U- 8
FEDERAL COAL LEASES: U017354 (1028.47 Acres)
U044076 (2367.82 Acres)
U020305 (1439.40 Acres)
COUNTY & FEE LANDS (966 ± Acres)
CARBON AND EMERY COUNTIES, UTAH

The Belina No. 1 mine located 20 miles northwest of Price, Utah and 4 miles southwest of Scofield, Utah, straddles the line between Carbon and Emery Counties. The area is dominated by a major north trending canyon that forms the upper portion of what is referred to as Pleasant Valley. Access to the mine site is attained from Federal, State and County roads. State Highway 96, connecting the towns of Scofield and Clear Creek, also provides access to the railroad siding that has been reactivated by Valley Camp for the Utah No. 2 mine. Coal from Belina No. 2 can be moved by truck to the railroad siding located a short distance above Scofield.

Total acres lease are 4835.69 Federal acres and 966 ± Fee Acres, the mine plan itself only encompasses a total of 2740 acres, according to the Central Utah EIS. The Belina No. 1 mine is bounded on the northwest by the Skyline mine operated by Valley Camp. Due to the presence of the Connelville Fault which separates the two mines, a lease exchange had been worked out to maximize recovery of the coal along the fault zone. Belina No. 1 mine operates on the southeast side and Skyline operates the northwest side of the fault. The Federal leases involved in the split are U020305 and U044076.

The Connelville Fault is a complex zone with a width up to 1000 feet. The total displacement across the zone increases from 55 feet in the north to 200 feet in the south. The O'Connor Fault trends parallel to the Connelville Fault (NE-SW) and has a maximum displacement of 90 feet. The O'Connor Fault forms the eastern barrier for the Belina No. 1 mine. Strata under most of the lease area dips 3° to 6° to the southwest; in the northwest portion of the area, the Clear Creek Anticline causes the strata to dip to the northwest, creating a dome area in the middle.

Mineable coal seams in the Belina mine plan are the Upper and Lower O'Connor seams. The Belina No. 1 mine is to be on the Upper O'Connor seam and a proposed Belina No. 2 mine has been speculated for the Lower O'Connor seam. The Upper O'Connor seam is known to reach 20 feet in thickness within the mine plan area and lies 55 to 125 feet above the Lower O'Connor seam. An older mine plan indicated the possibility of an experimental section of the mine to be set aside for maximum recovery of thick seam mining, however, nothing else had been reported since that time. Both seams are reported as being in the Blackhawk Formation, the coal-bearing division of the Mesaverde Group. Coal from the two seams is ranked as high volatile B bituminous, containing few partings and little pyrite. The Lower O'Connor seam is known to split, but there are no indications of mining the lower split of the Lower seam (see Figure 1).

A 1978 study indicates reserves to be the following, in million tons:

	U017354	U020305	U044076
Upper O'Connor	18.53	18.51	2.30
Lower O'Connor	17.51	17.76	2.56
Total	36.04	36.27	4.97

The Central Utah EIS indicates a total in-place reserves of 79.0 million tons with 39.5 million tons indicated as recoverable, the recovery rate is implied to be 50 percent. With a possible production of at least 1.519 million tons, the in-place reserves may not have been altered to any great extent. Similarities of reserves for the Upper an

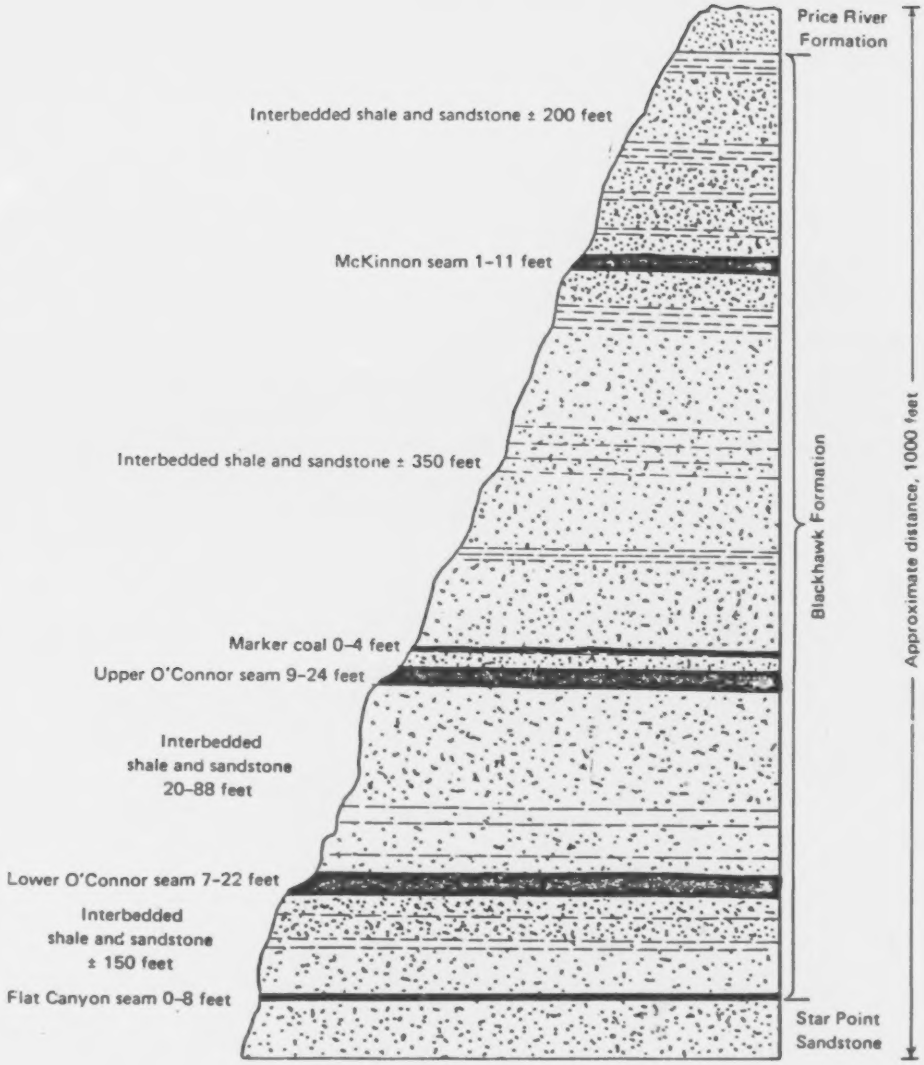
Lower Seams in the U017354 lease and the U020305 lease show that the thickness of the seams to be close. The small tonnage in U044076 reflects the small portion of the lease to be mined by Valley Camp.

Quality data are reported only for the Upper O'Connor seam, the Lower O'Connor is supposed to be similar. The Upper Seam is reported as follows: Ash - 9.0%, Fixed Carbon - 42.9%, Volatile Matter - 42.3%, Sulfur Content - 0.6% and a Btu per pound of 12,182.

Valley Camp has encountered an igneous dike in the development of the South Main and received permission to drive through the dike. In doing this, Valley Camp will create three entries, one for a central conveyor belt and two adjacent entries for intake air courses. Also encountered on the West Main is faulting assumed to be associated with the Connelville Fault. The displacement is 12 to 14 feet, Valley Camp plans to mine until displacement is met, then retreat, extracting pillars and then cross the fault and extend the West Main until major faulting again is encountered.

Reclamation is not expected to create any problems as surface disturbance is being kept to a minimum. Of significance is a natural gas pipeline that crosses the property. The gas transmission lines are to be supported by sufficient coal pillars to prevent damage from subsidence.

Mining is to start in a canyon cut by the Eccles Creek about 6000 feet south of the main Eccles Canyon. At the mine site, a portal terrace would be excavated for five main portals entries on 80-foot centers with two fan installations. The main entries of the mine will be down dip of the seam and eventually they will be driven toward the outcrop in the canyon to the west. A second set of entries will be turned from the main entries to nearly split the reserve block-panel entries and then room and pillar mining areas will be driven off this second set of entries. It is planned that pillars will be pulled on retreat from the panels and in parts of the mine, bottom coal will also


Price River Formation
Interbedded shale and sandstone ± 200 feet
McKinnon seam 1-11 feet
Interbedded shale and sandstone ± 350 feet
Marker coal 0-4 feet
Upper O'Connor seam 9-24 feet
Interbedded shale and sandstone 20-88 feet
Lower O'Connor seam 7-22 feet
Interbedded shale and sandstone ± 150 feet
Flat Canyon seam 0-8 feet
Star Point Sandstone
Blackhawk Formation
Approximate distance, 1000 feet

--Generalized stratigraphic column, O'Connor mine, sec. 31, T. 13 S., R. 7 E.

be taken. Mining will be accomplished by continuous mining sections with shuttle car and conveyor belt haulage to a bin at a level below the portal terrace. Truck loading will occur at the bin for haulage to the rail siding or other local markets.

Production Capability Analysis

The reserves identified for the presently operating Belina No. 1 mine and the planned Belina No. 2 mine are above average in both their quality and extent. The mines will be located in the Upper and Lower O'Connor seams, respectively. Since the No. 1 mine will overlie and be superimposed on the No. 2 mine and both mines have projected mineable seam thicknesses of 18 feet, the in-place reserves are almost equally divided between the 2 mines.

There are two presently identified factors which could have a significant impact on the final recovery rates that are obtained for the mines. The LMU is bracketed by two major faults, the 'Connor and Connelville. In neither case is the amount of differential vertical move the principal concern. More importantly, it is the question as to the degree of disturbance in portion of the coal seam, near the faults. Preliminary investigation indicates that this area of disturbance could be as much as 1000 feet wide along the Connelville Fault. The company is taking the approach of driving as close to this fault as conditions will allow and determining the western boundaries of the mines in this way.

The second factor is the thickness of the coal. Continuous miners can only take approximately 12 feet of the 18-foot thick coal. Practice in the past has been to leave the balance of the seam as top coal. The company has indicated that it is considering a benching operation where the top part of the seam is taken on the first pass and the bottom portion on a second pass.

Assuming partial recovery of coal left in pillars during secondary mining, this approach would result in an overall resource recovery on the order of 50 percent. With single pass mining this figure will be closer to 35 percent.

The problem with a benching operation with continuous miners is the increase in unit operating costs and the increased potential for roof control problems. An alternative solution, one which would result in lower unit operating costs and which would also increase the overall recovery rate to as high as 70 percent, is a multi-lift longwall operation. All the conditions present at the Belina property indicate that this approach could be implemented without significant difficulties.

There should be no difficulty in maintaining the projected 2 million-ton-per-year combined production rate for the Belina mines. This will require 4 to 5 continuous miners in each mine, 2 shifts per day, 5 days per week. This number of miners will require a shift production per miner in the range of 500 to 550 tons. This rate should be readily obtainable. The only factor that might interfere with this is the amount of water flowing into the mine. One of the reasons given for the closing of the mine which preceded the Belina No. 1, is the large amounts of subsurface water present.

The company has attempted to minimize the impact of the mines on the surface environment. Topsoil was removed from surface areas to be disturbed prior to commencing mine development in 1975 and will be stockpiled until reclamation activities are begun after the conclusion of mining. This disturbance is limited to that required for building sites and access road construction.

The presentation arrangement for coal transportation is to haul the coal 2 miles one way in trucks to a rail loadout facility located adjacent to the State route 96. Considering the limited distance, this should be adequate even when the mines reach their planned production of 2 million tons per year. Although the company has stated its intention of constructing an overland conveyor system to replace the truck haul.

Diligent Development Analysis

With the current mining system and recovery rate, it is estimated that the total mine life for each mine will be in the range of 15 to 20 years. It will be at the bottom end of the range if some type of benching operation is not used and at the top if it is. In either case, the mines will be in compliance with the requirement for diligent development and continuous operation.

STATE: Utah **REGION:** Uinta **COUNTY:** Carbon & Emery

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Belina No1,2	Valley Camp of Utah Inc (W.McKinnon est.) and (Canawha-Hocking coal and coke)	U0 17354 U0 44076 U0 20305	2740	1028.47 2367.82 1439.4 4835.69	1966	U/G	Approved 2-10-77	1.5

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 83.628

RECOVERABLE: 39.5

SOURCE: EIS

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah REGION: Uinta COUNTY: Carbon & Emery

MINE NAME (OR LEASE BLOCK): Belina No1,2

LESSEE(S) (OR OPERATOR): Valley Camp of Utah, Inc

NUMBER OF LEASES IN BLOCK OR PLAN: 3

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Upper O'Connor	Lower O'Conner						
FORMATION	Blackhawk	→						
RANK	hv Bb	→						
THICKNESS	up to 20'							
Btu/LB	12,182							
SULFUR (%)	0.6							
ASH (%)	9.0							
MOISTURE (%)								
FIXED CARBON (%)	42.9							
VOLATILE (%)	42.3							
SEAM DEPTH								
IN-PLACE RESERVES ①	39.34	37.94						
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND	77.28	6.348	83.628	IC
RECOVERABLE:	TOTAL				Interagency Task Force
	SURFACE				
	UNDERGROUND			39.5	EIS

NOTES: ① source: IC
Producing from upper O'Connor only

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

449

STATE: Utah **REGION:** Uinta **COUNTY:** Carbon + Emery

MINE NAME OR LEASE BLOCK: Belina No1,2.

LESSEE(S): Valley Camp of Utah Inc.

NUMBER OF LEASES: 3

DATE MINE OPENED:

PROJECTED CLOSING DATE: 2007

REMAINING MINE LIFE: 27

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY 1.5

RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979: 1.519484 ①

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	0.5		
1981	0.65		
1982	0.75		
1983	0.85		
1984	1.0		
1985	↓		
1986	↓		
1987	↓		
1988	↓		
1989	1.0		
1990	1.1		
Post 1990	18.7		

NOTES: ① From mine plan

O'Connor fault - 400' long

Connelville fault - 200' long

Operating on U017354 - 191 employees

Belina No.2 is directly below Belina No1

All Figures Shown in Million Tons

PRODUCTION SUMMARY

2B, #3

GENEVA MINE
UNITED STATES STEEL CORPORATION
MAP LOCATION U-1
FEDERAL COAL LEASES: SL046612 (280.00 Acres)
SL066145 (1552.17 Acres)
CARBON AND EMERY COUNTIES, UTAH

The Geneva Mine is located 24 miles east-southeast of Price, Utah and can be found on the northwest quarter of the Woodside, Utah 15-minute quandrangle. The mine straddles the Carbon and Emery County line. The mine entrance is located on the westward facing Book Cliffs. The total area under lease is 4466.17 acres, of which 1832.17 acres are Federal Leases. The Mine Plan or the Logical Mining Unit includes a total of 3906 acres.

According to U.S. Steel, Federal Lease SL 046612 is currently in production and has a projected depletion date of reserves in 1986. Federal Lease SL 066145 is now in production and is expected to be depleted in 1991-1992 at the current production rate.

All coal seams in the area are contained within the Blackhawk Formation of the Mesaverde Group dipping to the east at 7° to 9°. The three known seams and their thicknesses are as follows: The Upper Sunnyside seam ranges in thickness from 0-4 feet; the Lower Sunnyside ranges in thickness from 10-16 feet; and the Kenilworth seam ranges in thickness from 0 to 4 feet (see Figure 1 and 2.)

The Lower Sunnyside seam is of the greatest economic importance and has been extensively mined within the LMU boundaries. These seams outcrop on the Book Cliffs, the overburden ranges from more than 200 feet in some areas to greater than 3,000 feet in other areas. The occurrence of bumps increases, from moderate to severe as the overburden increases beyond 1,500 feet. This is controlled by the size of the pillars, the idea is to let the pillars yield progressively rather than store the energy.

The presence of faults do not prohibit the mining but require recognition in the mining plan since they are not closely spaced. The greatest displacement of one fault exceeds 20 feet of vertical movement.

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UNITED STATES USS STEEL CORPORATION

A3-1318

GENERALIZED LITHOLOGIC SECTION GENEVA MINE COAL PROPERTY

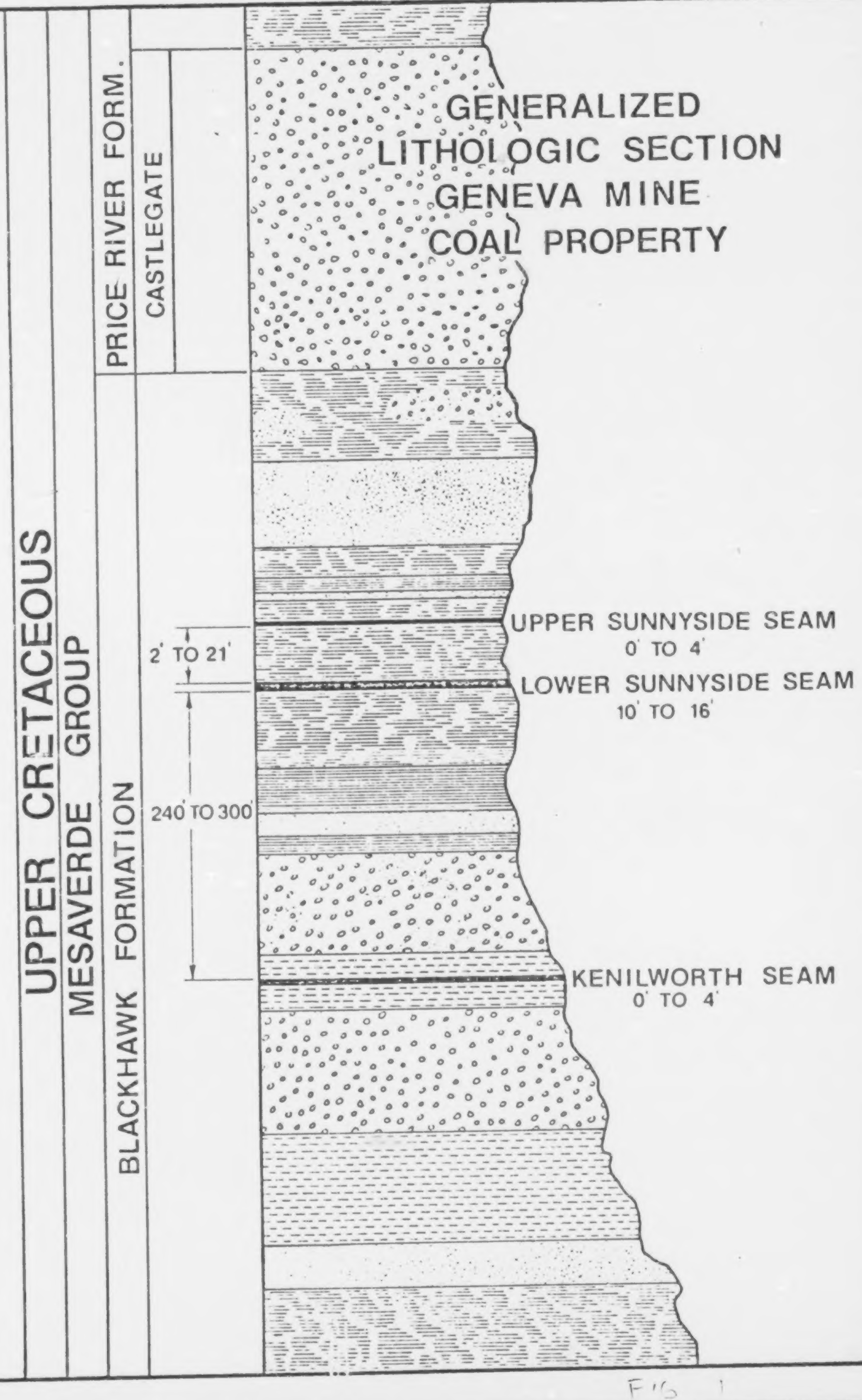

UPPER CRETACEOUS
MESAVERDE GROUP
PRICE RIVER FORM.
CASTLEGATE
BLACKHAWK FORMATION
2' TO 21'
240' TO 300'
UPPER SUNNYSIDE SEAM
0' TO 4'
LOWER SUNNYSIDE SEAM
10' TO 16'
KENILWORTH SEAM
0' TO 4'

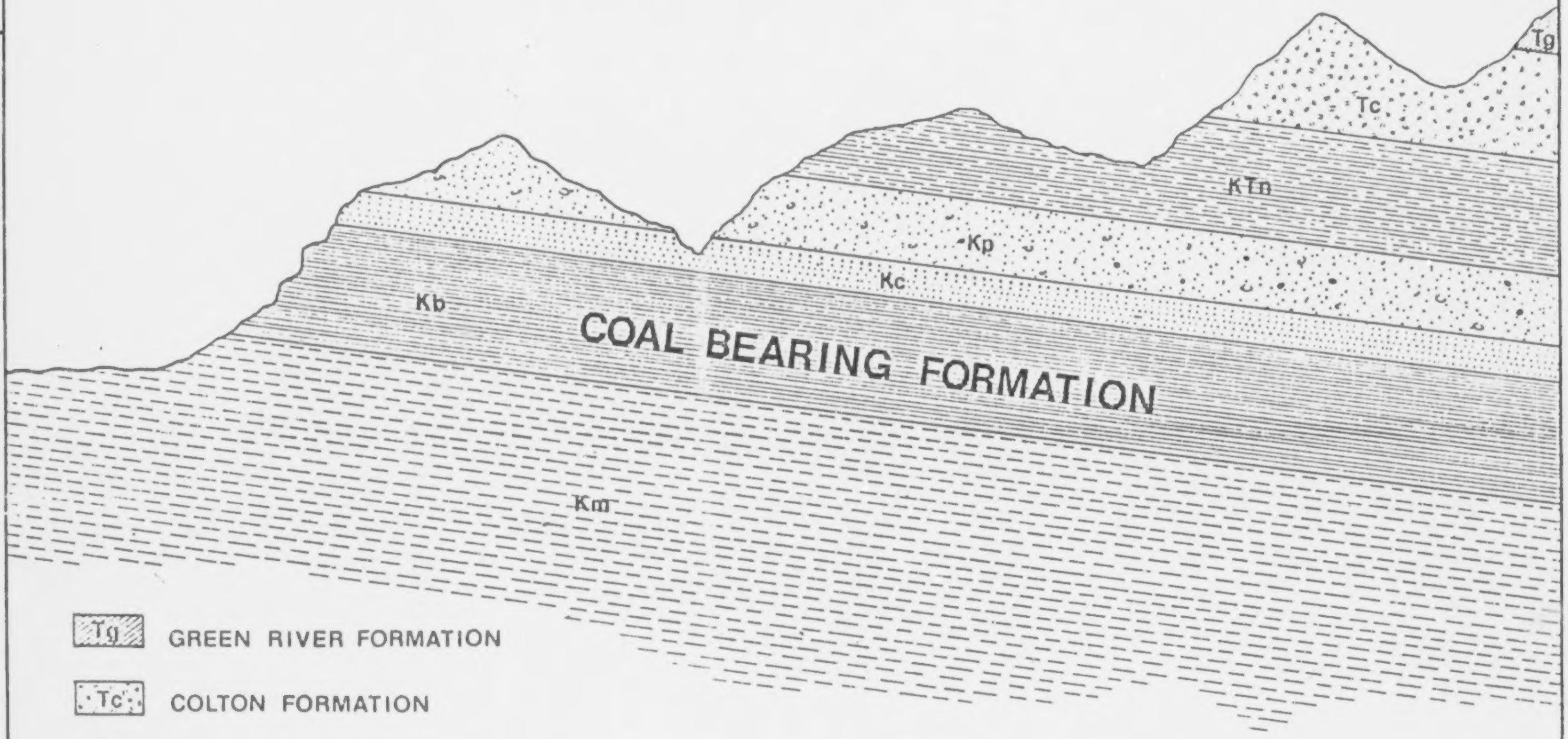
FIG 1

DRAWN E. SANDERSON 3/77 CHECKED ______ APPROVED FOR SAFETY ______ APPROVED ______

ENGINEERING DEPARTMENT

DRAWN E SANDERSON 3/77 CHECKED ______ APPROVED FOR SAFETY ______ APPROVED ______

ENGINEERING DEPARTMENT
WESTERN DISTRICT COAL


Tg
Tc
KTn
Kp
Kc
Kb
COAL BEARING FORMATION
Km

Tg GREEN RIVER FORMATION
Tc COLTON FORMATION
KTn NORTH HORN
Kp PRICE RIVER FORMATION
Kc CASTLEGATE SANDSTONE
Kb BLACKHAWK FORMATION
Km MANCOS SHALE

TYPICAL SECTION
GENEVA MINE
COAL PROPERTY

UNITED STATES USS STEEL CORPORATION

A3-1317

FIG. 2

453

3B, #3

A standard washed coal analysis (moisture free) of the Lower Sunnyside is as follows: Btu/lb - 13,500; Ash - 5.25%; Sulfur - 0.75%; Volatile Matter - 39.30% and Fixed Carbon - 55.45%. The coal obtained from the seam is classified as metallurgical grade coal. No analysis of inherent moisture is available, but approximates the washed coal standard moisture of 5.25 percent.

Both the Upper Sunnyside and the Kenilworth seams are considered unmineable due to low seam thickness. Mining the Lower Sunnyside would provide hazardous conditions for the Upper Sunnyside seam 20 feet above, destroying all floor and roof conditions.

Conventional room and pillar mining methods are employed in the Geneva mine, utilizing continuous miners for extraction and shuttle cars for coal transportation. Development entries are driven in the top eight to nine feet of the coal seam. Upon retreat, most of the pillars are extracted and the bottom coal is taken, after which more of the pillars are removed to aid in caving in the roof. Coal is transported from the mine by both track and conveyor belt haulage. It is then crushed to minus six inches in size and conveyored overland to a tipple to be loaded on unit trains, then shiped to the U.S. Steel Wellington Coal Cleaning Plant for processing with clean coal shipped to the U.S. Steel Corporations Geneva Steel Works at Orem, Utah. Total production from the Mine can vary from 300,000 to 600,000 tons per year through 1991. Production from Federal leases is about 50 percent of the Mine production.

Reclamation of the Federal lease will occur to the extent that the portal will be sealed. The portal surface area will be revegetated in accord with the vegetation plan being submitted to the state of Utah and the Office of Surface Mining.

UT-20

Production Capability Analysis

Mining operations being conducted at the Geneva mine are based on a conventional room and pillar method using continuous miners for coal extraction. Operations are complicated both by the thickness of the Lower Sunnyside seam, 10 to 16 feet, and coal bumps. To maximize total coal recovery in the thicker portions of the seam, the company will first mine an 8 to 10 thinkness from the top of the seam. Where possible, the extraction of the upper portion of the seam will be followed by a pass of the continuous miners to extract the lower bench of coal.

Coal bumping occurs in the portions of the mine which are under a greater depth of cover. Past experience has shown that bumping may begin when cover exceeds 1200 feet. The projected cut-off for mining operations is when the depth of cover exceeds 2500 feet. Bumping is controlled by varying the size of pillars and spacing.

The current annual productino rate is 330,000 tons.

Transportation of coal from the mine is well organized. Coal is moved overland from the mine to a unit train loadout facility by conveyor. The rail haulage from the loadout point to the Geneva works of U.S. Steel is less than 150 miles.

Surface environmental impact from the mining operations is minimal. Directly adjacent to the portal there has been disturbance of the land for the construction of mine support buildings and a coal crushing and sizing plant. This land will be reclaimed when mining operations are concluded. Impact of underground subsidence of the surface should be minimal because of the depth of cover.

Diligent Development Analysis

The mine is presently projected for operation through 1991. The mines will have no problems meeting diligence requirements on the subject leases given long production history. Original leases for this mine were issued in 1929 and operations began shortly thereafter.

STATE: Utah **REGION:** Uinta **COUNTY:** Carbon & Emery

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Geneva Coal	United States Steel Corp.	SL046612 SL066145	(1) 3906	280.0 1552.17 1832.17	(1) 2634	U/G	Approved 1-23-78	0.67

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 2.407

SOURCE: IC

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:
(1) OTA estimate

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

I

STATE: Utah REGION: Uinta COUNTY: Carbon & Emery

MINE NAME (OR LEASE BLOCK): Geneva

LESSEE(S) (OR OPERATOR): U.S. Steel Corp.

NUMBER OF LEASES IN BLOCK OR PLAN: 3

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Upper Sunnyside	Lower Sunnyside	Kenilworth					
FORMATION	Blackhawk	→	→					
RANK		B.t.						
THICKNESS	0-4'	10'-16'	0-4'					
Btu/LB		13,500	13,390 (1)					
SULFUR (%)		0.75	0.3					
ASH (%)		5.25	7.4					
MOISTURE (%)		5.25	3.1					
FIXED CARBON (%)		55.45	49.4					
VOLATILE (%)		39.3	43.0					
SEAM DEPTH		0-2000'						
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			2.407	IC

NOTES: Additional 0.28 - 0.5 tons may be obtained upon retreat.
Lower sunnyside most economical to mine.
(1) SOURCE: KEYSTONE "U.S. COAL MINE PRODUCTION BY SEAM", 1980-

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah REGION: Uinta COUNTY: Carbon & Emery

MINE NAME OR LEASE BLOCK: Geneva

LESSEE(S): U.S. Steel corporation

NUMBER OF LEASES:

DATE MINE OPENED: 1976

PROJECTED CLOSING DATE: 1987

REMAINING MINE LIFE: 7

REMAINING RECOVERABLE RESERVES:

FEDERAL: 2.407 IC

NON-FEDERAL:

MINE DESIGN CAPACITY 0.67

RECOVERY RATE: 40①

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	0.25		
1981	0.25		
1982	0.25		
1983	0.19		
1984	0.19		
1985	0.19		
1986	0.19		
1987	0.19		
1988			
1989			
1990			
Post 1990			

NOTES:

① estimate

Dip of 7°-9° creates pressure and difficulties as mine goes deeper

44% of SLO 46612 remained unmined

Mine plan production estimate at 0.809 Tpy - 1978

Sunnyside fault may limit mining on down dip side of fault.

All Figures Shown In Million Tons

PRODUCTION SUMMARY

O'CONNOR MINE (BELINA NO. 2)
VALLEY CAMP OF UTAH, INC.
MAP LOCATION U - 8

FEDERAL COAL LEASES:	U020305	(1,439.40 Acres)
	U017354	(1,028.47 Acres)
	U067498	(501.70 Acres)
	U044076	(2,367.82 Acres)
COUNTY COAL LEASE:		(290.00 Acres)
PRIVATE COAL LAND:		(160.00 Acres)

CARBON AND EMERY COUNTIES, UTAH

Valley Camp of Utah, Inc., submitted plans in 1976 for approval to mine from two proposed underground mines on the same Federal leasehold within the Manti-La Sal National Forest. The two mines would be the Belina No. 2 and the O'Connor mines, to be integrated with the company's existing Belina No. 1 mine.

The proposed mines are located about 20 miles northwest of Price and 4 miles southwest of Scofield, Utah. Main access to the mines would be in Whisky Gulch, a side canyon off Eccles Canyon, and Boardinghouse Canyon. A personnel entry would be provided in Finn Canyon.

The proposed mines would be located at the northern end of the Wasatch Plateau, which reaches elevations of 10,000 feet in the proposed mining area. The lease areas are characterized by rugged surfaces with slopes of 25 to 33 percent common. The proposed mining area is underlain by the Star Point Sandstone, Blackhawk and Price River Formations of the Upper Cretaceous Mesaverde Group. The Blackhawk Formation is the coal-bearing unit. The dominant structural feature of the mining area is the north-trending Clear Creek anticline. The anticline is cut by several faults, the largest being the north-northeast-trending Pleasant Valley fault, east of the mining area.

Three commercial coal beds on the leasehold are the Upper and Lower O'Connor and the McKinnon beds. Regional faulting has separated the beds into three mining areas; the Connelville block between the Connelville and O'Connor faults, the area west of the Connelville fault, and the area east of the O'Connor fault. The proposed mine would remove coal from the Upper and Lower O'Connor beds on the east side of the O'Connor fault and from the McKinnon bed on the west side of the O'Connor fault. No plans have been submitted to mine the McKinnon bed east of the O'Connor fault.

Lease exchanges between Valley Camp of Utah, Inc. and Routt County Development Ltd. have been negotiated to more efficiently recover the coal across the Connelville fault. Mining plans provide for mining the upper beds before lower bed recovery. Mining techniques are proposed that could result in maximum recovery of the coal resource in the thicker portions of the beds of the Belina No. 2 and O'Connor mines.

The coal at the Belina No. 2 and O'Connor minesites is classified as high volatile B bituminous steam coal. Coal sampled from the three beds at the O'Connor mine has a heat content of 12,000 to 12,500 Btu/lb and a sulfur content of 0.5 percent. Total in-place reserves are estimated to be 52,000,000 tons for Belina No. 2 and 27,000,000 tons for the O'Connor mine. Based on a 50 percent recovery rate, 13,500,000 tons are to to be mined from the O'Connor Mine.

The surface above the entire 2,740 acres of mine workings of the Belina No. 2 and O'Connor mines would be subject to subsidence. Over the 1,700 acres of Belina No. 2, an average of 11 feet of the Lower O'Connor bed would be removed. This would be in addition to the 11 feet of the overlying Upper O'Connor bed to be extracted first by the Belina No. 1 mine.

Mine workings at the O'Connor mine would extend over 1,040 acres. East of the O'Connor fault, a minimum of 22 feet of coal probably would be removed from the O'Connor beds, which lie in places within 300 feet of the surface. West of the O'Connor fault, 11 feet of coal probably would be removed from the McKinnon bed, which lies 100-700 feet from the surface; 350 feet of interburden separate the McKinnon beds from the lower-lying O'Connor beds being mined from the Belina mines.

At a recovery rate of 50 percent, an estimated 39 million tons of coal would be removed from the Upper O'Connor, Lower O'Connor, and McKinnon beds. Unmined coal, estimated at 39,000,000 tons, would remain in-place as pillars, fire walls, and other roof-supporting structures.

Until the O'Connor mine approaches full production, coal would be hauled by trucks on the Boardinghouse Canyon access road. The company then plans to install 1.4 miles of conveyor to transport coal from the O'Connor mine to the Belina minesite. Here it will join the estimated 2.5-mile conveyor belt to be installed to move coal from Belina No. 1 down Whisky Gulch and Eccles Canyon to the rail loadout facility. The entire conveyor system from the O'Connor mine to the rail loadout would be on private land.

The mine area is accessible from U S 6 via Utah 96 (U-96) and present roads up Eccles, Boardinghouse, and Finn Canyon. The Denver and Rio Grande Western Railroad maintains the rail spur from the mainline at US 6 to the Utah No. 2 mine. The section south of the Utah No. 2 mine is in disrepair.

Source: Final Environmental Statement, Central Utah Coal, 1979.

STATE: UTAH **REGION:** UINTA **COUNTY:** CARBON & EMERY

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
O'CONNOR	VALLEY CAMP OF UTAH	U020305(1)	2740	1439.4				
		U067498		501.7	450.0	U.G.	INCOMPLT M.P.	1.3
		U017354		1028.47				
		U044076(1)		2367.82				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 13.5

SOURCE: EIS

ASSOCIATED LEASES WITH REASONS WHY:

All Figures Shown in Million Tons

COMMENTS:

(1) LEASES SHARED WITH BELINA NO. 1 AND SKYLINE

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: UTAH REGION: UINTA COUNTY: CARBON & EMERY

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
O'CONNOR	VALLEY CAMP	4	U.G.

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Upper O'Connor	Lower O'Connor	McKINNON					
FORMATION	BLACKHAWK	→	→					
RANK	hvBb	hvBb	hvBb					
THICKNESS								
Btu/LB								
SULFUR (%)								
ASH (%)								
MOISTURE (%)								
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			13.5	EIS

NOTES:

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: UTAH **REGION:** UINTA **COUNTY:** CARBON & EMERY

MINE NAME OR LEASE BLOCK: O'CONNOR

LESSEE(S): VALLEY CAMP

NUMBER OF LEASES: 4

DATE MINE OPENED: 1983

PROJECTED CLOSING DATE: 1993

REMAINING MINE LIFE: 10

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY 1.3

RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983	0.2		
1984	0.4		
1985	0.6		
1986	0.8		
1987	1.0		
1988	1.1		
1989	1.1		
1990	1.3		
Post 1990	3.9		

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

8B, #3

SKYLINE MINE (Source 1979 Mine Plan)
COASTAL STATES ENERGY COMPANY AND GETTY MINERAL
RESOURCES COMPANY (JOINT-VENTURE, SEPTEMBER 8, 1978)
MAP LOCATION U - 8

FEDERAL COAL LEASES: (1)	U020305	(1,439.40 Acres)
	U044076	(2,357.82 Acres)
	U0142235	(520.00 Acres)
	U0147570	(2,092.70 Acres)
	U073120	(557.22 Acres)
CARBON COUNTY LEASE		(65.00 Acres)

CARBON AND EMERY COUNTIES, UTAH

The Skyline Mine is located in Carbon and Emery Counties, Utah, approximately 22 miles northwest of Price, Utah. The mine is near the north end of Wasatch Plateau, in mountainous terrain approximately two miles southwest of Scofield, Utah. Utah State Highway 31 passes within four miles of the western permit boundary. From that point, it is about eight miles farther west to Fairview, Utah, where U.S. Highway 89 leads northward to Thistle, and southward to Interstate 70 near Salina. The Denver and Rio Grande Western Railroad maintains a spur which connects the Utah No. 2 mine (east of the Skyline Mine, in Pleasant Valley) with the main line at Colton Junction. This spur will service the Skyline Mines as well as the Utah No. 2 mining operation. Surface owners are designated as U.S. Government, Helen Marakis, Nick and Kovla Marakis, and Milton Oman.

The structural geology of the Skyline Mine area is generally characteristic of broad anticlinal flanks. The major faulting is apparently sharp and clean with little drag or gouge. Localized folds in the strata, other than the regional dip from the Clear Creek anticline itself, appear to be minor or non-existent.

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[1] The total acres controlled by Coastal/Getty is 6400 in the Skyline Mine due to agreement with the adjacent operator dividing the property along a major fault. U020305 is being mined under an agreement with Valley Camp of Utah, Inc., the portion of the lease and coal rights to the north and west of the Connelville Fault is transferred to Coastal States Energy.

In general, the Skyline Mine area contains two faults of significant displacement and there is the possibility of several faults of small displacement in between them. The Connelville Fault has a vertical displacement of approximately 250 feet to the west at the southern portion of the property. The downward displacement near Eccles Canyon, however, diminishes to 70 feet. The Connelville Fault forms the southeastern boundary of the permit area.

A second major fault (the Valentine) on the Skyline permit area is located about one-half mile east of Huntington Canyon and roughly parallels the canyon. Although the surface trace may be readily seen, displacement appears to be moderate.

Three mineable coal seams are present in the basal coal zone of the upper coal-bearing unit of the Blackhawk Formation. In ascending order, they are the Lower O'Connor "A", the Lower O'Connor "B", and the Upper O'Connor seams. These coals are of high-volatile B rank and in general contain few partings and little pyrite.

Representative quality analyses for the seams obtained from the Automated Coal Lease Data System are:

	Upper O'Connor Seam	Lower O'Connor Seam
Sulfur	0.7%	0.6%
Ash	6.0%	6.2%
Moisture	6.3%	6.2%
Btu/lb	13,250	13,300
Fixed Carbon	46.1%	50.0%

Lower O'Connor "A" Seam

The Lower O'Connor "A" seam is completely absent or badly split with rock partings in the southeast part of the permit area, but reaches a maximum thickness of 25 feet near the northern boundary of the mine area. The seam is, stratigraphically, the lowest coal which is mineable within the mine area.

Lower O'Connor "B" Seam

The Lower O'Connor "B" seam is of mineable thickness over the southern two-thirds of the mine area, but is thin or absent to the north. In the southwest corner of the mine area, the seam reaches its maximum thickness of nearly 17 feet.

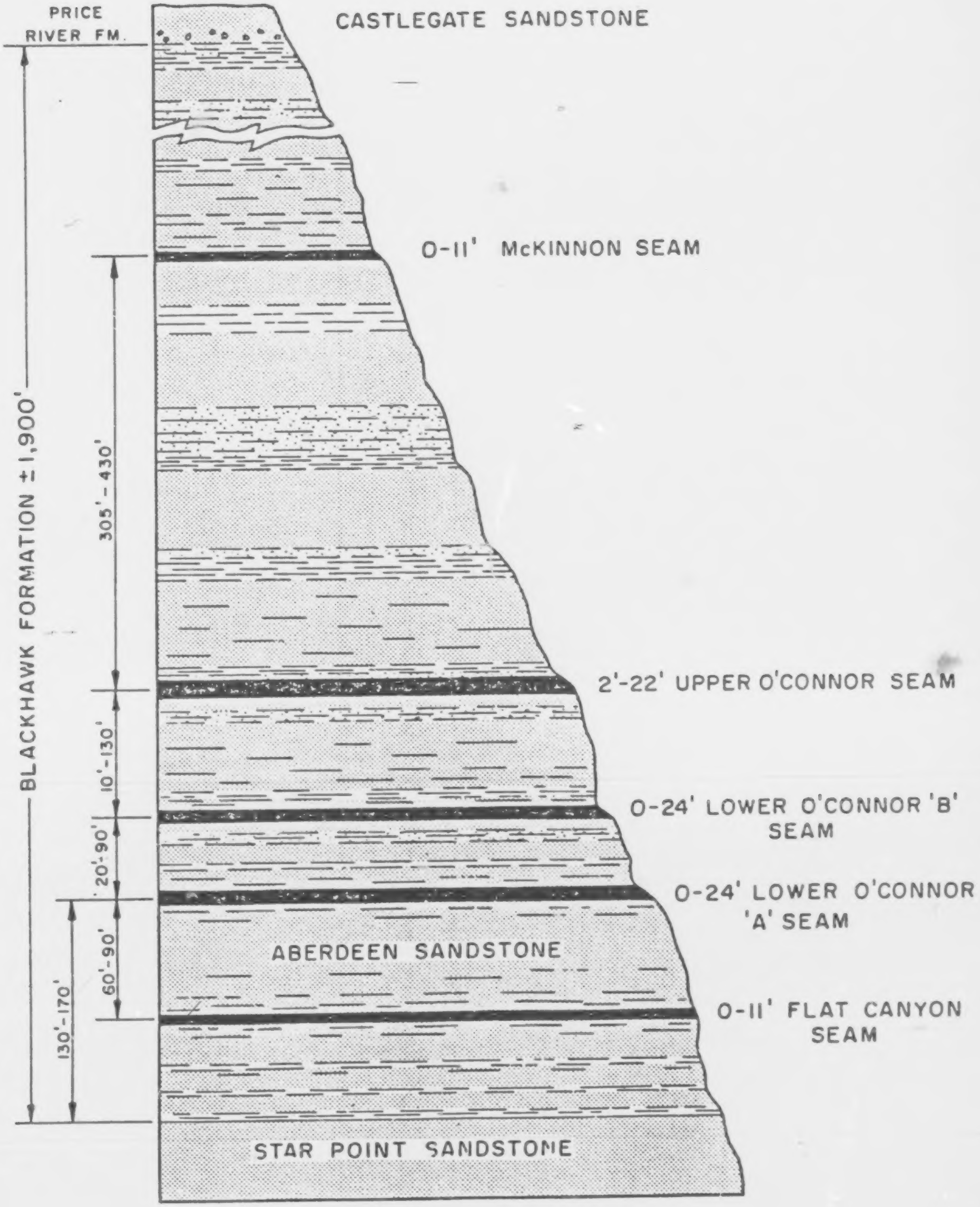
Upper O'Connor Seam

The Upper O'Connor seam is thickest in the east central part of the mine area where a maximum thickness of 19 feet is reported. The seam thins to less than six feet in the southwest portion of the mine area, and to less than three feet along most of the northern boundary.

The mining plan for the Skyline Mine indicates that the development of the mine portals were started where the mineable thickness of the Upper and Lower O'Connor Seams outcropped. The selected point of the drift entry is enhanced by the close proximity of the railroad transportation and some flat areas outside of the portal.

Three entry portals will be used at each drift entry location for the intake of air and the transportation of mining crews and materials, and one portal will be used to exhaust air. The number of portal entries will increase to four within the mine in order to reduce the velocity of the air. The single return entry will increase from one to five entries within the mine to facilitate a reduction of air resistance losses. One additional entry portal will be used for the conveyance of coal from the mine.

The configuration of entries is similar for the Upper O'Connor and the Lower O'Connor "A" seams. The Upper O'Connor seam however, will have two additional entries separated by a solid barrier from the entries used for the Upper O'Connor Mine. These entries will be used to return exhaust air from the Lower O'Connor "B" Mine through an internal shaft. The size of portals will vary to conform to the mineable height of the Upper O'Connor seam and the Lower O'Connor "A" seam.


PRICE
RIVER FM.
CASTLEGATE SANDSTONE
BLACKHAWK FORMATION ± 1,900'
0-11' McKINNON SEAM
305'-430'
2'-22' UPPER O'CONNOR SEAM
10'-130'
0-24' LOWER O'CONNOR 'B' SEAM
20'-90'
0-24' LOWER O'CONNOR 'A' SEAM
ABERDEEN SANDSTONE
60'-90'
130'-170'
0-11' FLAT CANYON SEAM
STAR POINT SANDSTONE

GENERALIZED COLUMNAR SECTION -

ECCLES CANYON AREA

The main entries, driven through the coal outcrops in Eccles Canyon, will comprise the principal coal haulage, personnel access, material routes, and ventilation courses for the mining operations. Ten entries are recommended for each mine. The use of a single exhaust fan will achieve proper ventilation for the entire life of each mine. Safety barriers of sufficient width will be left on both sides of all main and submain entries to protect them throughout the life of the mine.

Seam access to Upper O'Connor and Lower O'Connor "A" will be through 2 sets of 5 main portal entries, each spaced at 80-foot centers. Each entry will be 18 feet wide. The selection of five portal entries will minimize surface impact and operational costs. Three portal entry headings will be used for the intake of air, one for the coal haulage belt system and one for the exhaust air. The center entry will be used for coal supply. The total number will be expanded to the standard 10 entry main once inside the mine. Barrier pillars, 200 to 225 feet in width and dependent on review of overburden depth, will be maintained on each side of the mains.

Access to Lower O'Connor "B" seam will be accomplished by driving a rock entry from the Upper O'Connor seam. All development entries will be cut to a height limit of 10 feet. Entries will be driven in the top 10 feet of coal where coal thickness exceeds 10 feet unless the economic or safety conditions warrant otherwise.

Longwall mining is proposed for the extraction of large uniform blocks of mineable coal and will result in increased production rates and overall recovery. Mine layouts are based on longwall mining in areas where the panels are more than 2,500 feet in length and where a suitable longwall panel can be constituted. Recoverable reserves in longwall mining areas are based on mining a maximum of 12 feet thickness of coal.

/

The proposed longwall mining system consists of three basic integrated subsystems; self-advancing roof support, shearer, and conveyance.

The longwall mining operation will utilize two sizes of equipment in order to mine the variations in seam thicknesses locally encountered. One equipment size, suitable for extraction heights of five to eight feet, and the other size suitable for extraction heights of eight to twelve feet, will be utilized as appropriate.

In areas where coal is thicker than the height capacity of the mining equipment, the unmined coal will be left in the bottom of the bed, unless economic or safety conditions warrant otherwise.

Room and Pillar Method

In order to ensure the maximum recovery of reserves safely and economically, it is desired that the room and pillar method of mining be used as follows:

1. To develop the mains, submains and panel entries.

2. To extract panels of length limited to 2,500 feet or less. This is desirable as longwall mining of this size panel would be economically prohibitive since installation and removal of longwall equipment would be required for a relatively small coal tonnage.

3. To protect the surface features. Applicable under the areas of the gas pipeline influence where a maximum of 50 percent of the mined thickness will be extracted.

These factors, which affect the proposed mine plan, can be accommodated by the use of room and pillar mining and could not be attained by the longwall mining method. Room and pillar mining will be implemented only for the above three mine conditions; for other areas, recovery of reserves will be maximized by longwall mining methodology.

All entry and panel development will be accomplished by continuous miners using the room and pillar method of mining. Panel development will be achieved by driviing three panel entries from the main entries to the designated panel limits. Each mining panel will then be developed from these entries on the retreat. Coal will be transported from the continuous miner to the belt feeder by diesel haulage units. Coal will be conveyed out of the panel by belt conveyors.

The production rate of the room and pillar method using continuous mining units is principally dependent on the height of the coal seam being mined. The calculated production rates are shown in the following table.

Continuous Mining Unit Production

Seam Height (ft)	Tons/Year	Seam Height (ft)	Tons/Year
5	168,000	9	236,000
6	185,000	10	252,000
7	202,000	11	269,000
8	219,000	12	286,000

The production rate of the continuous mining units is also based on a scheduled two shifts/day of production and one shift/day for maintenance purposes.

The rate of production of developed longwall units is expected to be:

Coal Seam	Tons/Year
Upper O'Connor	714,000
Lower O'Connor "B" Seam	702,000
Lower O'Connor "A" Seam	864,000

For tonnage estimation, longwall units are assumed to produce coal during 2-1/2 shifts/day. Overall scheduling of longwall operations includes 3 shifts/day, 240 operating days a year. Each move of longwall equipment to a new panel is considered to take 30 working days.

The productivity rates presented are the values expected to achieve reasonably if the mining is done as planned. The anticipated total recoverable coal is 124,500,000 tons of the 212,900,000 tons of total mineable reserves in the three principal coal beds.

The mining sequence of the proposed operations is indicated as follows by mine number and date production is to start and end.

	Mine No. 1	Mine No. 2	Mine No. 3
First production	January, 1982	January, 1987	January, 1982
Termination	December, 2012	December, 2015	December, 2015
Life	30 Years	28 Years	33 Years

Yearly production is projected to average 4.7 million tons per year with a peak of nearly 5.4 million tons. Initial production is estimated at 437,000 tons in 1982, and it will require nearly 10 years to reach peak production rates.

On the basis of the established guidelines and geological data interpretations, the total mineable reserves, by seam, have been calculated to be:

	Mineable Reserve (in M. tons)	To be Mined (in M. tons)	% Extraction
Upper O'Connor	67.16	37.67	56.1
Lower O'Connor "B" Seam	63.51	36.78	57.9
Lower O'Connor "A" Seam	82.18	50.5	60.9

Based on information collected from the mine plan, there were no indications of any market for the coal. It was mentioned that it was "to be marketed throughout the Western portion of the United States primarily for generation of electrical power". (page vi of Skyline Mine plan, 1979, Volume 1).

Production Capability Analysis

When at their ultimate production rate, it is planned for the Skyline mines to have a total of 5 longwall units and 8 continuous miners in operation. As indicated above, the intention is to use longwall units in areas of the mines where blocks 2500 feet or greater in length can be developed. This is necessry because use of smaller blocks would require a too frequent moving and setting up of the equipment, thus rendering the longwall operation less cost effetive than mining by continuous miner.

Depending upon the thickness of the coal being mined, the planned production rates are based on the assumption of continuous miner production in the range of 350 to 595 tons per machine shift and longwall production in the range of 1190 to 1440 tons per longwall shift. Both of these ranges are somewhat on the conservative side, but that will allow for unplanned production difficulties.

A potential production problem is the variation in thickness of all 3 mineable seams. Typically the seams will gradually thicken or thin as the operation moves from one extreme of the LMU to another. For example -- the Lower O'Connor "A" seam is completely absent or badly split with rock partings in the southeast part of the LMU, but reaches a maximum thickness of 25 feet near the northern boundary. Conversely, the Lower O'Connor "B" seam is of mineable thickness over the southern two-thirds of the LMU, but is thin or absent to the north. The Upper O'Connor seam is thickest in the east central part of the LMU where a maximum thickness of 19 feet is reported. This seam thins to less than 6 feet in the southwest portion of the LMU and to less than 3 feet along most of the northern boundary. Since these thickness trends are relatively constant, the impact on operations is to increase the complexity of the continuous miner and longwall scheduling.

The estimated recoverable reserves for the Skyline mines of 124.5 million tons is based on an overall recovery rate of approximately 58 percent. This is an above average rate for underground coal mining in general, but less than can normally be expected from a longwall operation. The company states in its mining plan that recovery could be increased by an additional 13.9 percent of the in-place reserves if the recoverable mining thickness were not limited to 12 feet. The company's explanation is, "It is impractical economically and on the basis of safety factors to mine more than 12 feet with existing technology." Mining techniques and equipment that would allow a mining height of more than 12 feet are currently in use in Europe and might be applicable to Western U.S. thick seams.

There are no adverse mining conditions to prevent the company from obtaining its planned production and recovery rates. The rock formations forming the roofs and floors for the mines are all competent. With limited exception, the strata separating the seams are sufficiently thick to prevent interference among mining operations on different levels. To help ensure that this does not happen, the company is superimposing more permanent facilities on the different levels. Also, mining operations on upper levels will be kept at least 2 years in advance of those on lower levels so that subsidence does not interfere with the recovery of any coal.

There are no significant environmental impacts that should result from the planned mining operations. The company has taken measures to minimize disturbance of surface areas and to collect and stockpile topsoil from those areas that must be disturbed. There are collecting pipelines for natural gas wells located at some points on the surface overlying the planned operations. Recovery of pillars under these points will be minimized so that the pipelines are not damaged as a result of subsidence. Otherwise, subsidence should not be a problem.

Coal produced from the mines will be transported to the rail loadout near the facility serving the Utah #2 and Belina mines. This will be achieved initially by truck and eventually conveyor.

Diligent Development Analysis

Current planning indicates that the recoverable reserves at the Skyline mines will be mined out in approximately 25 years. This would place the LMU well within the requirements for diligent development and continuous operations. There is no information to indicate that the company is seeking additional reserves or that they are even available.

STATE: Utah **REGION:** UINTA **COUNTY:** Carbon and Emery

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Skyline Mine	Coastal States Energy Co. and Getty Resources Co.	U020305① U044076 U0142235 U0147570 U073120	6400④	6967.14	65.00②	UG	Approved	5.4③

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 212.9

RECOVERABLE: 124.5

SOURCE: MINE PLAN

ASSOCIATED LEASES WITH REASONS WHY:

All Figures Shown in Million Tons

COMMENTS:

① Lease and coal rights north and west of the Connelville Fault is transferred to Coastal States Energy.

② Carbon County Lease

③ Initial production - 0.437 in 1982. It will take approximately 10 years to reach peak production rates.

④ Excludes acreage south and east of Connelville Fault mined by another operator.

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah REGION: UINTA COUNTY: Carbon and Emery

MINE NAME (OR LEASE BLOCK): Skyline Mine

LESSEE(S) (OR OPERATOR): Coastal States Energy Co. & Getty Resources Co.

NUMBER OF LEASES IN BLOCK OR PLAN: 5

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	L. O'Connor A	L. O'Connor B	U. O'Connor					
FORMATION	Blackhawk	→	→					
RANK	hV-B Bit	→	→					
THICKNESS	0-25'	0-17'	<3'-19'					
Btu/LB	13,300	→	13,250					
SULFUR (%)	0.6	→	0.7					
ASH (%)	6.2	→	6.0					
MOISTURE (%)	6.2	→	6.3					
FIXED CARBON (%)	50.0	→	46.1					
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES	82.18	63.51	67.16					
RECOVERABLE RESERVES	50.5	36.78	37.67					
RECOVERY RATE	60.9	57.9	56.1					

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL			212.9	
	SURFACE				MINE PLAN
	UNDERGROUND			212.9	
RECOVERABLE:	TOTAL			124.5	
	SURFACE				
	UNDERGROUND			124.5	

NOTES:

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah REGION: UINTA COUNTY: Carbon and Emery

MINE NAME OR LEASE BLOCK: Skyline Mine

LESSEE(S): Coastal States Energy Co. & Getty Resources Co.

NUMBER OF LEASES: 5

DATE MINE OPENED: 1982

PROJECTED CLOSING DATE: 2015

REMAINING MINE LIFE: 35

REMAINING RECOVERABLE RESERVES:

FEDERAL: } 424.5
NON-FEDERAL: }

MINE DESIGN CAPACITY 5.4

RECOVERY RATE: 56.1 - 60.9

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982	0.437		
1983	0.907		
1984	1.377		
1985	1.847		
1986	2.317		
1987	2.787		
1988	3.257		
1989	3.727		
1990	4.197		
Post 1990			

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

16A, #1

STARPOINT NO. 1 AND NO. 2
PLATEAU MINING COMANY
MAP LOCATION U-9
FEDERAL LEASES U7949 (240.00 acres)
(1,631.12 acres)
(1,360.00 acres)
CARBON AND EMERY COUNTIES, UTAH

Plateau Mining Company, a wholly owned subsidiary of Getty Mineral Resource Co., currently operates two mines near the town of Wattis, Utah, about 20 miles southwest of Price. Its holdings are bounded on the north and east by steep, barren cliffs that rise abruptly from about 7,000 feet to over 10,000 feet above sea level. Together, the Starpoint mines contain 6,126.73 acres, of which approximately 1,878 acres are State and Fee lands.

The LMU's Federal and State lease, plus the included private lands, contain three mineable coal seams: Wattis, Third, and Hiawatha. Together, these coal seams contain about 49,000,000 tons of recoverable coal. When combined with some 3,000,000 tons of reserves in the current area of operations, the company reserve base is approximately 32,500,000 tons. Plateau has expressed interest in leasing an additional 3000 acres of federal coal to the west and north of its Federal Lease SL031286. The reserves in this area have not been delineated, but the USGS estimates that the area contains approximately 35 million tons of in-place coal. Using a 68% recovery factor, recoverable reserves are on the order of 24 million tons.

The coal on Plateau's logical mining unit is found in the Blackhawk Formation of the Mesaverde group. Exploratory rotary diamond drilling by Plateau Mining Company has defined the thickness of each seam and the interval between over most of the property. The results of this program are:

Seam	Average Thickness (feet)	High	Interval in Feet Low	Average
Wattis	8	78.2	14.0	40
Third	8	82.2	45.2	60
Hiawatha	6	-	-	-

Coal characteristics of the three seams are for the most part identical; they are cleaned simultaneously in the preparation plant. Average washed coal quality on an as-received basis is as follows:

Moisture	9.5%
Ash	9.1%
Sulfur	0.6%
Btu/lb	11,660

Roof and floor conditions are generally good. The roof is primarily sandstone, with some areas of shale or siltstone. Most of the immediate roof is competent although varying thicknesses of thin-bedded and weak mudstones and carbonaceous mudstones occur at scattered locations. Floor material also is primarily sandstone or siltstone, with a few areas of shale in the Third seam.

The main top and overburden are predominately strong sandstone. Interval strength is adequate in areas where thickness of the material exceeds 40 feet and mining progresses stratigraphically from top to bottom.

Mining is presently conducted in the LMU's three mineable coal seams by underground room-and-pillar methods. The Hiawatha seam is developed through the Star Point No. 1, the Wattis seam from the Star Point No. 2, and the Third bed by way of rock slopes from the Star Point No. 2 mine portal.

Current projections indicate that eight units are to be in operation: Unit 1, the only unit operating out of the Starpoint No. 1 portal, operates 2 shifts on the Hiawatha seam; Unit 2, the Starpoint No. 2 mine operates 2 shifts on the Third bed; Unit 3, again out of the No. 2 mine, operates 1 shift on the Wattis seam; Unit 4, 5, and 6, the No. 2 mine, Lion Portal, to operate 6 shifts on the Wattis seam; and Unit 7 and 8, the No. 2 mine, Main West development, operates 4 shifts on the Third bed.

Plateau, as of November, 1979, had produced 1,200,000 tons of coal from the mine and was expected to increase production to 2,000,000 tons by 1984.

The present producing areas have been mined extensively in all three seams. Entries and barrier pillars in the three seams have not been superimposed to any degree in past mining and, as a result, poor roof conditions have been created. None of the seams to date has provided very uniform mining conditions. Small faults and dikes are common. The burned coal around the numerous peninsulas also has considerably reduced the overall seam recovery. Only developed reserves, those identifiable and accessible from the present workings, are being mined. They include small blocks of coal, peninsulas, and barrier and chain pillars. Plateau Mining Company will continue to mine these areas until a new area is made accessible through the rehabilitation program. This program is almost complete and units 4, 5, and 6 will soon be placed into production in this virgin reserve area.

The company's new area of development is located inside a horst and graben system having a vertical displacement of 250 feet. Access is through underground slopes located one mile underground and past previously mined areas. Initial production will come from the uppermost Wattis se~~am where~~ main entries will be driven to establish room-and-pillar sections.

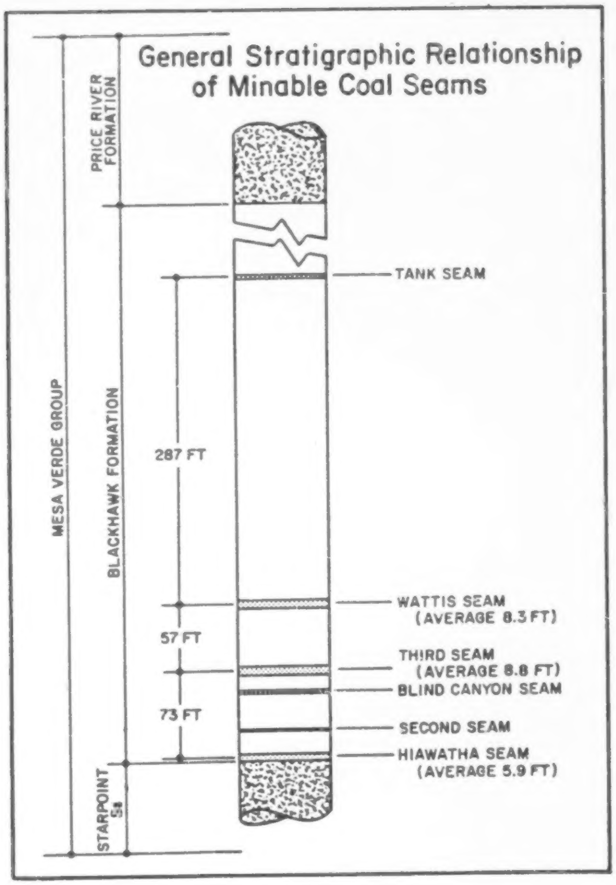

General Stratigraphic Relationship of Minable Coal Seams
MESA VERDE GROUP
PRICE RIVER FORMATION
BLACKHAWK FORMATION
STARPOINT Ss
TANK SEAM
287 FT
WATTIS SEAM (AVERAGE 8.3 FT)
57 FT
THIRD SEAM (AVERAGE 8.8 FT)
BLIND CANYON SEAM
73 FT
SECOND SEAM
HIAWATHA SEAM (AVERAGE 5.9 FT)

Figure U-6-1. General Stratigraphic Relationship of Minable Coal Seams at Plateau Mining Company Coal Mines (adapted from Coal Age, March, 1978).

Total recoverable reserves are determined by area available, average thickness, and a 68 percent extraction ratio. It must be noted that faults, splits, and any uneconomical coal resources are considered confidential, but this area is known to contain local faulting, splits, and dikes. A 40 percent reserve reduction will be included to compensate any possible mining restraints.

Recoverable Reserves

		SEAM	
Lease	Hiawatha	Third Bed	Wattis
U7949	100,000	1,500,000	450,000
SL031286	7,660,000	10,215,000	10,215,000
U13097	6,390,000	8,520,000	8,520,000
U37045	1,960,000	4,340,000	
Total	14,150,000	20,235,000	19,185,000
GRAND TOTAL		53,570,000 tons reserve	
Adjustment	(-40%)	32,142,000 tons recoverable	

Plateau Mining Company anticipates a yearly production of 2,000,000 tons/year if market conditions permit. The remaining life of this LMU can be approximated at 25 years, or through 2005. This production rate would be adequate to maintain diligent development as required by the Federal Coal Leasing Act of 1976.

The useful value of Plateau's coal is 75 percent steam and 25 percent domestic. It is distributed through the company's sales agent, Basic Energies, Inc. The FERC Form 423 reports indicate a steam coal supply contract between Union Electric of Jefferson County, Missouri and a mining operation in Wattis, Utah. Since Plateau's operations are located in Wattis, the contract is likely supplied by Plateau.

Coal from the Star Point mines is brought to the surface, crunched, and hauled by truck and overland conveyor about one mile to the preparation plant. The coal is then shipped to market via the D&RW Railroad. Plateau is proposing to construct a unit-train loading facility approximately one mile from the preparation plant.

According to Plateau Mining Company:

> Plateau's coal production can be used beneficially for either steam power generation or industrial base load consumption such as boiler fuel for cement processing/manufacturing plants. Plateau has its own sales organization through its parent company, Getty Mineral Resources. Coal markets for the Plateau coal exist mainly in West and Northwest Coastal region domestically and the Pacific rim countries of Asia on the export market. Sales can be expected to be split evenly between the domestic and export markets.

Production Capability Analysis

The two main difficulties that Plateau Mining Company must contend with in the operation of its Starpoint property are the excessive faulting and fracturing that has occurred on the LMU and the fact that past mining operations have been improperly planned. With the exception of the major fault blocks, there is little that can be done to contend with the faulting and fracturing. As mining operations advance, the competency of the sandstone roof rock must be monitored continuously to ensure that hazardous conditions are avoided. The impact of these conditions on the overall recovery rates for the mines cannot be determined, so the approach here has been to arbitrarily discount the in-place reserves by 40 percent.

The company's need to cope with the support and operating problems arising from past errors in mine planning for operations in the 3 seams will largely be solved as mining progresses into new unmined areas of the LMU. The lessons learned at Starpoint in this regard, are a strong endorsement of the practice of superimposing entry and barrier pillars and other major mine features for multi-seam operations.

Considering the size of the LMU and the fact that the company is mining 3 seams, there is no apparent reason why the company should not attain the 2 million-ton-per-year production rate it is planning. The current annual production rate of 1.2 million tons is based on the use of 5 continuous miners. Three of these machines operate 2 shifts a day and the remaining operate 1 shift a day. Assuming a nominal 250-day work year, this translates into a 550-ton shift continuous miner production rate. This rate is quite reasonable. In the event that mining conditions caused this per miner production rate to decline, the unused shift of the fourth and fifth miner represent a potential annual production capability in excess of 200,000 tons. Expansion of the current 1.2 million-ton-per-year rate to 2 million tons would be accomplished by adding 3 continuous miners to the existing 5.

Because of the close proximity of the Starpoint mines to the tracks of the Denver and Rio Grande Western Railroad, there are no apparent transportation difficulties. Coal is trucked from the Star Point No. 1 Portal and conveyed overland from the Star Point No. 2 portal to a preparation plant approximately 1 mile away. The coal from the plant is then trucked 1 additional mile to the D&GWR line. Plans are currently underway to construct a unit train load-out facility with an overland conveyor from the prep plant to the loading facility.

There are no known unusual environmental conditions associated with the operations. The present surface impact is the land required for the mine support buildings, the preparation plant and transportation facilities. There will undoubtedly be some subsidence caused by the operations. However, the remoteness of the mine and the fact that the land surface use is currently limited to grazing should mitigate against any problems arising from the subsidence.

Diligent Development Analysis

The current annual production rate for the Starpoint LMU places it in compliance with the requirements for diligent development and continuous operation. There is an indication that the company is seeking additional reserves. Depending upon the magnitude of the additional reserve tonnage that is acquired, if it is, the expansion to 2 million tons per year should keep the company in compliance.

Excerpts from the mining plan describing mining methods and projected production over the life are attached.

STATE: Utah	REGION: Vinta	COUNTY: Carbon & Emery	
MINE NAME (OR LEASE BLOCK): Starpoints No 1&2	LESSEE(S) (OR OPERATOR): Plateau Mining Co.	NUMBER OF LEASES IN BLOCK OR PLAN: 4 Federal 1 State	MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Wattis	Third	Hiawatha					
FORMATION	Blackhawk	→	→					
RANK	hvC-Bb	→	→					
THICKNESS ①	8'	8'	6'					
Btu/LB	11660	→	→					
SULFUR (%)	.6	→	→					
ASH (%)	9.1	→	→					
MOISTURE (%)	9.5	→	→					
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES ③	123.12	14.572	11.383	} See enclosed mine plan excerpt				
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			53.570	
RECOVERABLE:	TOTAL				MINE PLAN
	SURFACE				
	UNDERGROUND			49.075. ②	

NOTES:
① Average for coal
② Adjusted down 40% due to faults
③ See mine plan excerpt

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah **REGION:** Uinta **COUNTY:** Carbon & Emery

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Starpoints No 1 & 2	Plateau Mining Co.	U 7949		240.0		U/G	Approved	1.3
		SL 031286		1631.12			3-6-75	
		U 13097		1360.0			7-25-79	
		State Lease 22729	6126.73	3231.12	1878 ±			
		Fee						
		U 37045		697.26				
		ATM U7949		280.00				
		ATM SL03128		40.00				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 73.0 ①, Current recoverable 49.075

SOURCE: MINE PLAN

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

① With proposed new lease with 24 tons reserve

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah **REGION:** Uinta **COUNTY:** Carbon & Emery

MINE NAME OR LEASE BLOCK: Starpoints No 1&2
LESSEE(S): Plateau Mining Co.
NUMBER OF LEASES: 3
DATE MINE OPENED: 1977
PROJECTED CLOSING DATE: 2002
REMAINING MINE LIFE: 22

REMAINING RECOVERABLE RESERVES:
FEDERAL: } 32.142
NON-FEDERAL: }
MINE DESIGN CAPACITY 1.3
RECOVERY RATE: 55
CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION: 1.109 Keystone

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	1.0		
1981	1.1		
1982	1.4		
1983	1.7		
1984	2.0		
1985	"		
1986	"		
1987	"		
1988	"		
1989	"		
1990	"		
Post 1990	32.7		

NOTES:

Production rates depend upon market conditions

Mining Method - Room & Pillar, with pillar extraction upon retreat Longwall is still an option

Poor roof conditions caused by not superimposing pillars in the past

Area contains fault splits and dikes.

All Figures Shown In Million Tons

PRODUCTION SUMMARY

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3.3.16 Total Area for Surface Disturbance During Permit Term

Total area for surface disturbance during the permit term is approximately 200 acres. Individual areas are shown on Plates 2-2 and 3-1.

3.3.17 Additional Area for Surface Disturbance for Life of Mine

Surface disturbance in addition to what has already been disturbed will total 75 acres (see Plate 3-1).

3.3.18 Detailed Construction Schedule

No detailed construction schedule is needed since most surface facilities already exist. Plans and scheduling for the unit train loadout facility, the new refuse site, and the new shaft are currently too incomplete to establish construction schedules. The new shop at Lion Deck Portal will be completed in 1982. The initial Seeley Canyon breakouts will be completed in the next five years.

3.4 OPERATION PLAN

If Plateau Mining Company obtains the Castle Valley Ridge tract, market conditions improve, and a unit train facility is constructed, production at the Star Point Mines would rise to 4,000,000 tons/yr. However, the following discussion relates to annual production of 2,000,000 tons/yr, the level the mines will achieve by 1985 and an output the company feels will be sustained even if none of the conditions for higher production are met.

3.4.1 Mining Plans

Plateau Mining Company controls approximately 6,300 acres of land in Carbon and Emery counties, Utah, as shown in Plate 2-1. Although mining has been conducted on the property for many years, 72,170,000 tons of in-place reserves (minable reserves) remain to be mined in three coal seams. Coal in pillared areas of the old mines and areas which have been rendered economically or technically unminable by this work have been excluded from this reserve figure. Table 3-1 is a summary of reserves by seam for those seams more than 5 ft thick.

TABLE 3-1

Mineable Coal Reserves

	In-Place Tons	68% Recoverable Tons	80% Salable Tons
Wattis (Top Seam)	34,000,000	23,120,000	18,496,000
Third (Middle Seam)	21,430,000	14,572,000	11,658,000
Hiawatha (Bottom Seam)	16,740,000	11,383,000	9,106,000
Total	72,170,000	49,075,000	39,260,000

Some additional tonnage is still being recovered in old working areas in an effort to conserve this resource. If this quantity is added to the above recoverable tons, the life of the mine rises to somewhat more than 20 years, with a full capacity production of 2,000,000 ton/yr. Maximum recovery of the remaining reserves in the old mining area is expected to be about 1,000,000 tons of coal and will be completed on the following schedule:

Wattis Seam	1982
Third Seam	1983-1985
Hiawatha Seam	1983

It is estimated that 2,000,000 tons will be mined from entry pillars in these areas prior to cessation of operations.

Plates 3-3A through C show areas of the property which will be mined in each seam; Plates 3-4A through C show the projected sequence of mining in each seam by five-year periods. Surface areas of coal affected during each five-year period are shown in Plate 3-4A through C. Mining during the first five-year period has been projected to produce the following tonnages by year:

TABLE 3-2

Annual Mining Tonnage

Seam	1981	1982	1983	1984	1985
Wattis (Top)	550	885	1,342	1,750	1,750
Third (Middle)	402	250	250	250	250
Hiawatha (Bottom)	125	250	100	--	--
Total	1,077	1,385	1,692	2,000	2,000

(tons in thousands)

Production during this period, as in the others, will of course depend on market demands.

January 1, 1981, to January 1, 1986 (8,154,000 tons)

Mining will be concentrated in development work to block out panel areas for production in the virgin reserves west of the current workings. By January 1, 1985, 83% of the total mine production will come from the top seam (Wattis) in these virgin areas. To enable maximum recovery of these coal reserves, multiple seam mining methods will concentrate mining in the top seam to permit later recovery of the next undisturbed lower seam (Third Seam).

January 1, 1986, to January 1, 1991 (10,000,000 tons)

By June 1, 1986, most of the mine production will come from the top seam in the new reserve area. The majority of the reserves in the top seam, south and northwest of the main entries, will be exhausted by January 1, 1991. Mining can then be concentrated in the middle seam (Third Seam) below areas that will have been previously mined.

January 1, 1991, to January 1, 1996 (10,000,000 tons)

Fifty percent of the mine production will come from the top seam during this period. Thirty-three percent of production will come from the middle seam. In February 1991, development of the main entry in the bottom seam (Hiawatha) will begin and will yield 17% of the total mine production.

January 1, 1996, to January 1, 2001 (10,000,000 tons)

Fifty percent of the mine production will continue to come from the top seam until May 1, 1996. At that time, production for this seam will be reduced to 33% for the remainder of this period. On June 1, 1996, production will be reduced in the middle seam, and 50% of the total will originate from the bottom seam, with the remaining 17% coming from the middle seam.

Expected production capacity is as follows:

First year	1.1 million tons (beginning 1981)
Second year	1.4 million tons
Third year	1.7 million tons
Fourth year	2.0 million tons
Fifth year	2.0 million tons
Sixth to twentieth year	2.0 million tons per year
Total	38.2 million tons

3.4.1.1 Orientation and Multiple Seam Considerations

Access to the reserves on this property has been through: (1) the drift portals of No. 1 and No. 2 mines on the eastern outcrops, which enter the Hiawatha Seam and the Wattis Seam, respectively, and (2) the newly constructed portal that enters the Wattis Seam on the eastern outcrop at the Lion Deck Portal Area. Portals 1 and 2 will be used primarily to recover the remaining coal in the vicinity of these portals.

The Lion Deck Portal entries traverse the old mining area, but their objective is to reach and develop virgin coal areas of all minable seams in Federal Leases SL 031286, U 13097, and possibly the Castle Valley Ridge property to the west. These entries will provide ventilation to the proposed seven working sections, carry men and materials in and out of the mine, and enable transportation of coal from the working faces of all three seams to the surface. Access to various seams will be made by inside rock slopes located at strategic points for most efficient operation (see Plate 3-5). Mining will occur to the north and south of these entries to recover the coal to the outcrops or property boundaries, as the case may be.

Approximate total coal acreage on the property, which is that land west and south of the outcrop line shown on Plate 3-3C, is 3,500 acres, excluding the graben fault area in Federal Lease U 13097. Acreage to be mined during each of the above five-year periods is shown on Plates 3-4A through C and is listed below.

Years	Acres
1981 - 1986	802.5
1986 - 1990	1108.3
1991 - 1995	991.8
1996 - 2001	799.3

Because this mining will take place in three seams within an vertical distance of about 120 ft (Figure 3-6), special considerations and techniques are required to assure maximum recovery and safety. Although all seams are not minable over all areas of the property (Plate 3-3 A through C), in order to protect work in underlying seams in those areas in which more than one seam is minable, all main entry pillars will be columnized to provide vertical support and prevent "punching" of overlying pillars into underlying workings.

Should punching occur, the roof in the underlying seam will be weakened or even broken, resulting in difficult, unsafe working conditions and loss of recoverable coal. On the other hand, if underlying seams are mined first, resulting failure of the roof will in all probability adversely affect the overlying coal seam and its roof. Damage can be so extensive as to render the seam unminable. Plateau has, therefore, planned its mining sequence to remove the coal in the top seams in areas where more than one seam will be mined before the underlying seam is mined. In this way, strata above and below each seam and, in fact, the seam itself cannot be damaged by mining in adjacent seams, again permitting maximum recovery of reserves. This procedure is important because the company plans to mine the maximum amount of coal from each seam through the use of room-and-pillar mining systems with pillar recovery and/or longwall methods. In either system, the roof will be allowed to break over large areas, permitting the overlying strata to move downward (subside). Because these seams are separated by only 50 to 60 ft of strata, damage is possible in overlying seams.

As previously stated, mining of all three seams over the entire area is impossible because various seams do not exist locally or are too thin to mine (Plate 3-3 A through C). Where this condition exists in a seam, the lower coal seam may be recovered while work in other areas of the top seam is in progress.

3.4.1.2 Portals, Shafts, and Slopes

Three main access portals currently exist on the property. They enter the coal seams on excavated sites which have been prepared by the company to expose the coal seam and provide solid strata above the opening. Portal 1, in the Hiawatha Seam, is located on the coal outcrop and has been in existence since 1967. It provides access via entries driven in the coal seam. Since only about three years of work remain in this mine, little needs to be discussed about it. When the area is mined out or the openings are no longer needed for ventilation, the portals will be sealed as discussed in Section 3.6.3.1.

Portal 2, in the Wattis Seam, is similar to Portal 1. It also will be abandoned in 3 or 4 years and sealed as above.

The third main portal exists at the Lion Deck. Inside this portal the slopes connect the Wattis Seam to the Third Seam at a point where a split in the Wattis Seam renders it unmineable. Two slopes, one at 10% grade and the other at 30% grade connect the two seams to enable mining in the Third Seam and to form a haulageway in the Third Seam below the unminable portion of the Wattis Seam. A second set of slopes is being driven upward further west beyond the split (Plate 3-5) to reconnect the western mining in the Wattis Seam to the main haulage system.

Current underground workings in the three seams have broken out to the surface at specified locations along the outcrop to facilitate ventilation. Such openings have been made in Mud Water Canyon and will soon be made in Seeley Canyon to shorten travel distances for ventilating air and to increase the cross-sectional area of mine aircourses. This reduces air losses while providing an increase in air volume to improve the health and safety of the miners, and also saves electric power.

When mining reaches Federal Lease U 13097, a vertical shaft from the surface to the coal seam is anticipated in the vicinity of Sec. 14 SE-1/4. This shaft will be used for ventilation but may also serve to carry men and materials into the mine to shorten underground haulage distances. Because construction is still sometime in the future, the exact location or detailed plans and design are not known at this time. Exploratory drilling and underground mining in the area are necessary in order to finally locate and design this shaft. Exploratory drilling is planned for the summer of 1981. Area locations for all of the above facilities are shown on Plates 2-2 and 3-1. Underground and surface access to the shaft area requires use of portions of the Castle Valley Ridge property (see Appendix 2A).

3.4.1.3 Mining Methods

Room-and-pillar mining with continuous mining machines is the current mining system. At least eight such sections are projected for operation at 2,000,000 ton/yr. This system (room and pillar) was the only logical choice for recovering the coal in the old workings and for driving development openings into the virgin areas. Longwall and, in most instances, shortwall methods are not amenable to the types of situations encountered in this initial work. Continuous mining machines were selected over conventional loading and cutting machines because: (1) the coal cuts rather easily, and (2) manpower is saved. In the virgin reserve areas on the western side of the property, however, development work will be designed and laid out to accommodate either room-and-pillar or longwall work. Longwall will be used wherever possible to decrease manpower, improve safety, increase production, and recover the maximum percentage of the reserves; continuous miners will drive development openings and mine rooms (with full pillar recovery) in those areas unsuitable for longwall installation.

The attached approved Roof Control and Ventilation Plans (Appendix 3B) provide detail on the face work and pillar recovery. Entries on 80-ft centers will be driven 20-ft wide and full seam height with 20-ft crosscuts on 80-ft centers leaving 60-x 60-ft pillars (Figure 3-7). Adjustments to these dimensions will be made as depth of cover, roof and floor conditions, etc. dictate. Room sizes and pillar dimensions are similar to those in the entries. In fact, each set of five panel entries becomes a set of rooms when it reaches its limit. Beginning at the inby end of the panel, two rooms are driven at right angles 160 ft from the inby entry of the set. The pillars in these two rooms plus the corresponding pillars in the entries are then removed. This process is repeated until all of the coal has been mined back to the submain entries. A new panel is then driven adjacent to the first one and the process is repeated. Current projections indicate that panels will be 2,000 to 2,500 ft long. The roof control plans, approved by the Mining Safety and Health Administration (MSHA), describe the face mining procedures and roof control practices in detail for development or first mining as well as for pillar or second mining.

Longwall work will be accomplished on 500- to 600-ft faces advancing maximum distances in accordance with overall mine layout. Automated steel shield-type, self-advancing roof supports with longwall shearing machines, pan face conveyors, and belt conveyor haulage from the faces to the surface will be used.

In fact, belt conveyor transportation of coal from the faces to the surface will be used regardless of the mining system. Continuous miners will load into shuttle cars, which will discharge into feeder-breakers at the inby end of panel belt conveyors. These machines will crush the oversize coal and load at predetermined rates onto the underground mine belt system. Longwall production is loaded onto the belt system by the armored, chain conveyor along the face. At present, 36-in belt conveyors are used in panel entries, 42 in submains, and 48 in mains. Speed and capacity are established to provide for surges in loading from operating sections without overloading and spillage.

Men and materials enter the mine and are transported to and from face areas on rubber-tired, diesel-powered equipment. Investigations are underway into the use of various methods of handling men and materials.

Electric power is supplied to the mines through overhead lines on the surface at 46,000/13,200 V. It is transformed at each portal by company-owned transformers to 13,200/4,160 V for underground distribution circuits and to 440/220/120 V for surface use in the portal and railroad loadout areas. Underground voltage is transformed in the area of usage to 440/220/120 V as required by the equipment. All circuits are protected by appropriate switches and automatic circuit breakers as required by law.

Ventilation is currently supplied to the mines through the above portals by two electric powered, axial vane exhaust fans and one similar blower fan located on the surface. The exhaust fans have a capacity of 600,000 and 110,000 ft^3/min; the blower fan discharges 135,000 ft^3/min. Total ventilating capacity is 850,000 ft^3/min of air, which is adequate for at least eight operating mine units. Ventilating procedures are detailed in the approved Vent ilation Plan (Appendix 3B).

3.4.1.4 Projected Mine Development

General overall mining layout for the property is designed to reach all areas of coal with the minimum number of permanent entries. This will reduce costs for entry maintenance and increase reserve recovery. Figure 3-6 helps to illustrate the basic approach and theory to mining this reserve. The relationship of the seams shown in this figure, and the existence of various unminable areas, must be kept in mind when applying the mining theories to practice.

Main entries are planned to be driven in two sets of either four, five, or six, with a 200-ft-wide pillar separating each set (Figure 3-7). Entries will be used for ventilation and to transport coal, personnel, and materials. The long center pillar broken by cross-cuts or submain entries at 2,500- to 3,000-ft intervals reduces leakage of intake air into the return air courses. The use of five or more entries on each side provides efficient operation of one miner section in each.

Main entry systems will be advanced westward approximately on the strike of the seam from the mine portal directly through the property to the boundary. They are located to provide the most efficient recovery of reserves on each side. Because they must service the mine throughout its life, these entries are thoroughly protected by at least 200-ft barrier pillars along each side. If it is desired to recover the pillars in this system after the mine has recovered all of its reserves, they can be mined on retreat to the portal.

Sets of submain entries spaced to fit property dimensions will be driven at right angles from each side of the mains to the limits of the property. In these seams, those on the right or north will advance slightly (about 2%) upgrade with the seam, those on the left or south slightly downgrade. Spacing of these entries along the mains will be designed to provide the proper length and direction of mining panels to accommodate the mining system projected for the area. The indicated existence of several north-south faults in Federal Lease ~~#~~ SL 031286 may influence the layout of mining panels in that area to mine between the faults rather than across them.

Panels will be driven from the submain entries, normally at right angles. The coal pillars supporting the panel entries will be extracted by the continuous miners commencing at the inby end of the panels and retreating to the mouth of the panels. Longwall panels may be provided as an alternate method of panel coal extraction.

Use of longwall panels will result in small areas of unmined coal in the vicinity of outcrops or odd-shaped corners which this system cannot reach because of the regular, rectangular shape of the panel. Such areas will be recovered by continuous miners using room-and-pillar work, which is more adaptable to irregularly shaped areas of coal. Also, in the interest of efficiency, longwall panels should be in excess of 3,000 ft in length. Where the location and direction of faults dictate, some of them may be installed in a north-south direction parallel to the submains. However, where practical, the use of either mining system will be possible in practically all panel layouts.

For longwall mining, the normal practice will be to locate entries in sets of three at right angles to the submains and spaced 500 or 600 ft apart (Figure 3-8) One set of entries becomes the headgate, the other the tailgate.

3.4.1.5 Retreat Mining

Underground coal mining procedures follow two basic approaches to recovery of the involved reserves. Regardless of the mining method, the sequence of reserve recovery can be classified as advancing or retreating. Sometimes considerable technical advantage can be obtained if the entire reserve can be developed and then mined from the most remote areas back to the portal. This would constitute overall retreat mining. However, for economic, financial, and production reasons, this is not generally possible. As a result, development work and mining are usually accomplished simultaneously as the workings advance into the property. Depending upon the mine layout, this can be an advancing system until development reaches the property boundary, after which it can become retreating and mine back to the portal. Thus, we have an advance-retreat situation for the entire property.

This concept can be applied to various parts of the mine as well--for instance, the main entries, submain entries, and even panels. If mining advances along both sides of any set of entries from their starting point to their termination, the system is advancing; if mining is not started until the entries reach their limit and then begins at the termination point on both sides, the system is retreating. If mining begins at the initiating point of the entries on one side and advances to the end, then moves to the other side and works out to the starting point, it becomes an advance-retreat system. Frequently this method is attractive, as it permits high-production work to proceed in combination with development, creates favorable strata control conditions, and, if done properly, facilitates ventilation and enhances safety of the operation. An overall advance-retreat system is projected for this mine. However, where longwall mining is used, the faces will retreat along the panel entries.

Advance-retreat is not to be confused with first and second mining, which applies primarily to room-and-pillar work. First mining refers to the excavation of rooms and entries, leaving the intervening pillars of coal in place. Second mining can accompany first mining as it advances into a solid block of coal, in which case it is advancing; or it can retreat through an area which has been first-mined. The former is probably the safer and preferred method. It will be used where second mining is applicable in Plateau mines.

1A, #3

DES-BEE-DOVE MINE
UTAH POWER AND LIGHT COMPANY
MAP LOCATION U- 10
FEDERAL COAL LEASES: U02664 (920.00 Acres)
SL050133 (80.00 Acres)
SL066116 (400.00 Acres)
NON-FEDERAL
LEASED ACRES
(1040.00 Acres)
EMERY COUNTY, UTAH

The Des-Bee-Dove mines are located eight miles north-northwest of Castle Dale, Utah. The mine plan is comprised of 2,280.0 acres of which 1,400.0 acres are Federal Leases and the remaining 1,040.0 acres are Fee lands.

The Des-Bee-Dove mines are three separate mines all operated by Emery Mining Corporation in the same area. The Deseret mine is operating on the Hiawatha seam; the Beehive and the Little Dove mines both operate on the upper or Blind Canyon seam. The Beehive and Little Dove mines are stratigraphically above the Deseret mine and therefore must be superimposed in layout. The upper mines are being mined in advance of the lower mine to insure roof and floor conditions are at an optimum.

Coal seams in the Des-Bee-Dove mines area are located in the Blackhawk Formation of the Mesaverde Group. The average thickness of coal in the Hiawatha seam is 8 feet while the Blind Canyon seam averages 12 feet in thickness. The overburden in the mine area reaches a maximum of 1,500 feet.

A major geologic factor influencing the mining sequence is the presence of faults striking generally N 7° E, the faults effectively breaking the reserves into discrete blocks. Surface mapping has indicated the possibility of a 400-foot wide shear zone extending through the center of the graben area between Maple Gulch and Stump Falts faults, and there is some preliminary indication that the Blind Canyon seam east of the Stump Flat Fault may thin to less than mineable thickness (currently 5 feet). These three factors will have a major bearing on the eventual approach taken to extract the coal in the two blocks, but a firm decision cannot be made until additional geologic data are collected and further engineering and economic studies are undertaken.

The coal seams of the area are good quality steam coals; the average falls within the following ranges:

Btu	11,400 - 12,900
Moisture	5.0 - 8.3%
Ash	5.6 - 13.2%
Sulfur	0.51 - 0.55%
Fixed Carbon	43 - 49%
Volatile Matter	36 - 42%

The mining method utilized in the Des-Bee-Dove Mines is a room and pillar mining method utilizing continuous miners. As Emery Mining Corporation is the operator, all three mines will be developed in the same procedure. The main entry development consists of 6 entries, each 19 feet wide with headings on 80-foot centers and cross-cuts every 100 feet. The actual headings per panel will depend upon the existing conditions and vary from three to five headings. The panel dimensions also vary with the centers on 80- by 100-feet or 60- by 80-feet. Rooms are driven on one side of the panel and on retreat, the pillars are pulled on the other side. The rooms that are separated by panels, are driven 19 feet wide on 50-foot centers, parallel to each other (Source: Coal Age, October, 1978).

Coal is removed from the face by continuous miners and transported in the mine by shuttle cars from the face to the belt conveyor system. Coal is transported from the mine to an open storage area outside of the mine. The main conveyor system is in the lower mine, the

Deseret Mine and coal mined by the Beehive mine in the upper seam is transported directly to the lower seam and fed into the main conveyor to be stored in the aforementioned open storage area. The coal produced by the Little Dove mine is transported by conveyor directly outside the mine to a lowering tower and moved to the Deseret mine level.

Production estimates for the years 1980 through 1982 are as follows in tons:

	Federal Prod.	Non-Federal Prod.	Total
1980	900,000	900,000	1,300,000
1981	1,000,000	300,000	1,300,000
1982	1,200,000	100,000	1,300,000

Production is expected to continue until 1993 when the mines will be abandoned, 56 percent of all of the coal is expected to be extracted from the Federal leases.

Utah Power & Light is presently constructing two additional 430 MW units, Nos. 3 & 4, at its present Emery generating complex. One million tons of coal annually will be required for each unit. Utah Power & Light is proposing to shift one million tons of annual production from the mines to Emery units 3 and 4.

The Hale plant in Orem, Utah; the Gadsby-Jordan plant in Salt Lake City, Utah; and the Carbon plant in Castle Gate, Utah collectively consume about 1,000,000 tons annually. In addition, the Church of the Latter-Day Saints (Mormons) receive some coal for distribution to wards and schools.

Production Capability Analysis

The Des-Bee-Dove mines are located adjacent to the Wilberg-Deer Creek-Cottonwood LMU which is also owned by UP&L and operated by Empire Mining Company. Although these mines are all located in the Blind Canyon or the Hiawatha seams, the areal extent of the Des-Bee-Dove mines is considerably less that of the mines in the other complex and as a result their combined production rate of 1.3 million tons is only a fraction of the 6 million-ton-per-year rate planned for the Wilberg-Deer Creek-Cottonwood LMU.

There is considerable faulting in the Des-Bee-Dove mines whereas this condition is almost totally absent in the Wilberg-Deer Creek-Cottonwood mines. There has been an attempt to identify the potential impact of the faulting on future mining operations by drilling a number of additional exploration holes. The initial conclusion was that a major block of the Blackhawk Formation had been dropped as much as 100 feet relative to surrounding parts of the Formation. Had this been the case, it would have required considerable additional investment and increased operating costs to extract the coal from the seams in the dropped block. More recent drilling and mine advance indicates that the block is downdropped only a minor amount on the southern end of the Bear Creek Fault. This will allow easy access to both seams in the block from existing workings to the east.

Mining is based entirely on the use of continuous miners in a room and pillar operation. It is estimated that the mines are currently operating with a combined total of 5 continuous miners operating 2 shifts per day, 5 days per week. This translates into approximately 520 tons per miner shift which is a very reasonable figure.

Without consideration of the coal left in the entry and boundary pillars, the 80 by 100-foot entry and crosscut spacing with 19-foot machine cuts is equivalent to a 39 percent theoretical recovery rate. Since the depth of cover over the workings averages a modest 1500 feet, it is not unreasonable to expect that secondary recovery of coal in pillars would increase the overall recovery rate for the entire LMU to 50 percent. This figure could be decreased somewhat if conditions in the shear zone along the fault prove to impact on mining operations more than a nominal amount.

Other than the potentially adverse conditions attributable to the faulting, there is no indication of other conditions which could affect mining operations. The roof and floor rocks are both the relatively competent sandstones which are found in the other UP&L mines. The seam thicknesses for the Blind Canyon and the Hiawatha seams are 12 and 8 feet, respectively. Both these thicknesses can be readily mined by continuous miners. There is some anticipation of hitting pockets of water during mining, but again these are a result of the faulting.

Surface facilities are similar to those for the Wilberg-Deer Creek-Cottonwood complex. The portals and their associated access roads and coal transport conveyors are located on the steep canyon walls and the surface buildings and other facilities are located on the valley floors below. Environmental impact is limited to land disturbance resulting from the construction of these facilities and the interference of the access roads with surface water runoff.

The production from the Des-Bee-Dove mines currently goes to fuel power pants located at various points in the UP&L system. There has been some consideration of switching this coal to fuel the Emery #3 and #4 units when they come into operation in 1983 and 1985. If this is done, then this coal could be transported to the plant on the same overland conveyor system used by the Wilberg and Cottonwood mines. In either case, there is no apparent difficulty in getting the coal to its chosen point of use.

Diligent Development Analysis

Currently identified reserves in the mines translate into approximately 15 years of remaining life for the mines. Hence, the LMU is well within the requirements for diligent development and continuous operation. Because of the presence of the nearby Wilberg-Deer Creek-Cottonwood LMU, it is not really possible for the Des-Bee-Dove LMU to obtain additional reserves to extend its life.

STATE: Utah **REGION:** Uinta **COUNTY:** Emery

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Des-Bee-Dove	Utah Power and Light Co.	UO2664 SLO50133 SLO 66116	2280	920 80 400 1400	1040	U/G	Approved 8-12-75	1.343

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 39.454

RECOVERABLE: 19.728

SOURCE: USGS

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:
Additional 240 acres needed for LMU
Little Dove and Beehive mines operate on Blind Canyon seam, 130' above the Deseret Mine operating the Hiawatha seam

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah REGION: Uinta COUNTY: Emery

MINE NAME (OR LEASE BLOCK): Des-Bee-Dove

LESSEE(S) (OR OPERATOR): Utah Power & Light Co.

NUMBER OF LEASES IN BLOCK OR PLAN: 3

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Hiawatha	Blind Canyon						
FORMATION	Blackhawk	→						
RANK	Bit.	→						
THICKNESS	8' Ave.	6'-14'						
Btu/LB	11,400	12,900						
SULFUR (%)	0.5	0.55						
ASH (%)	5.6	13.2						
MOISTURE (%)	5.0	8.3						
FIXED CARBON (%)	43.0	49.0						
VOLATILE (%)	36.0	42.0						
SEAM DEPTH								
IN-PLACE RESERVES	10.561	11.611						
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND	16.9			USGS

NOTES:

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah REGION: Uinta COUNTY: Emery

MINE NAME OR LEASE BLOCK: Des-Bee-Dove

LESSEE(S): Utah Power & Light Co

NUMBER OF LEASES: 3

DATE MINE OPENED: 1976

PROJECTED CLOSING DATE: 1993

REMAINING MINE LIFE: 13

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY 1.343

RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	1.3	0.84	
1981			Captive
1982			
1983			
1984		0.84	
1985		0.151	
1986			
1987			
1988			
1989		0.151	
1990	1.3	0.692	
Post 1990	5.2	2.076	

NOTES:

56% of all recoverable reserves are to be from federal leases
Faults striking N 7°E, break reserves into discrete blocks
Multiple seam operation

All Figures Shown In Million Tons

PRODUCTION SUMMARY

514

EMERY DEEP MINE
CONSOLIDATION COAL COMPANY
KEMMERER COAL COMPANY
MAP LOCATION U -11
FEDERAL COAL LEASE: U5287 (720.00 Acres)
EMERY COUNTY, UTAH

The Emery Deep mine is an existing underground coal mining operation, located approximately four miles south of Emery, Utah. Originally, the Emery Deep mine was known as the Browning mine which first opened in 1881 and intermittingly produced coal until 1930. Since 1930, there has been a constant production of coal from the mine.

Federal Lease No. U5287 encompasses approximately 720 acres of coal reserve. The lease property is located three (3) miles south of the town of Emery, Utah at the southern end of Castle Valley in Emery County. The southeastern corner of the lease property is approximately 300 feet northwest of the active portion of the Emery Deep mine.

Castle Valley is a wide belt of relatively flat land between the Wasatch Plateau and the San Rafael Swell to the east. However, the valley narrows considerably near the town of Emery because of the western marginal influence of the swell. It is believed that the valley owes its existence to the softness of the thick Mancos Shale Formation which underlies it. The Ferron sandstone is the only resistant member noting that it forms a low ridge in the valley with a westward sloping surface.

Coal in the Ferron sandstone member is located in the lower third portion of its upper unit. There are 13 coal beds present. 5 of them are regarded as the principal coal beds -- the K, IJ, G, C-D, and A. The coal bed which Consol proposes to underground mine at the present time, in Federal lease No. U5287 is the IJ seam. Cleat orientation of the coal is N. 25 E. with an 88° dip of the cleats. No significant geologic problems have impeded Consol's progress in mining.

From our current mining operations, there is no evidence of any subsidence that has taken place in the mining area. The mine uses both spot conventional and roof bolting techniques for roof control.

Overburden in the lease area ranges from 400 to 900 feet in thickness, increasing in depth to the northwest, the main geologic units being the Bluegate Shale and the Ferron sandstone, both of which are highly competent.

Total reserves for the "I" Zone have been calculated on a minimum mineable coal thickness of four feet. Coal quality ranges and averages have been calculated from the available drilling data, all data presented in the following table are based on the value for raw coal only:

	Range	Average
Moisture %	2.7 - 4.3	3.8
Ash %	8.6 - 10.6	9.3
Volatile Matter %	34.0 - 41.0	39.0
Fixed Carbon %	43.0 - 51.7	47.9
Sulfur %	0.37 - 1.76	0.96
Heat Value Btu/lb	12,164 - 12,676	12,498
thickness feet		13.8

Reserves within the lease are indicated as follows: 17,300,000 total tons inplace; 5,536,000 tons recoverable using a 29 percent recovery rate.

Mining heights of 8 feet in main entries, 8.5 to 9 feet in panel entries, and 9 to 10 feet in the rooms have proven, in the existing Emery Deep operation to be the optimum heights for maximizing recovery and maintaining safe operating conditinos with stable roof and ribs.

Recent drilling information indicates that although the I-Zone may have 20-25 feet of total coal, the seam splits into three distinct horizons of the outer perimeters of the present mine. The parting materials between the splits grades from shale to sandstone and varies from 0.25' to over 16'. Therefore extraction of the I-Zone will require ramping up and down within the zone. Since the partings are too thick to mine, mining may only take place within one or two horizons of the zone depending upon the parting thicknessess. This fact combined with the partial pillar extraction methods now used at the Emery Mine will significantly change the mineable and recoverable reserves estimates. These new reserves estimates are currently being performed and are not now available.

Only 51 acres of Federal Lease U5287 contains a coal seam of 19 to 21 feet in thickness. In the remainder of the I-Zone the lease area either pinches out or is split.

The Emery mine will continue to use an entry and room method of mining, similar to that which has been successful in the prior development of the mine.

A seven entry, Main Entry Development System is used to maintain adequate ventilation openings through the life of the mine.

Panel entries will be driven to the northeast and southwest, off these Main Entries. Panels to the north of the mains are planned for advance mining, utilizing a North Bleeder System to assure proper ventilation of both the active workings and old workings. Panels to the south of the mains are planned for retreat mining, utilizing a South Bleeder ystem and the mined out north panels for proper ventilation of both areas.

In the production panels, five entries will be driven with rooms taken on the advance. These panels will be driven at 70° - 90° off the main entries. This allows for positive water drainage from each panel such that the operator may effectively control water in the mine. In addition this angle, through experience in the existing mine, has proven beneficial in maintaining good roof conditions.

The Emery mine will be producing coal from three continuous miner units.

The projected production rates of Federal and Fee coal for the Emery Mine are contained in the following table:

PROJECTED PRODUCTION RATES

Year	Federal Coal (tons)	Fee Coal (tons)	Federal Acres Affected
1. 1981	0	730,000	0
2. 1982	0	980,000	0
3. 1983	200,000	975,000	20
4. 1984	420,000	1,005,000	44
5. 1985	670,000	1,005,000	71
6-14. 1986-92	700,000	1,000,000	75

585 Acres of Federal coal will be mined, the remaining 135 acres do not contain any commercially mineable reserves.

Consol has initiated substantial research in the area of maximizing recovery from the thick coal seam in the Emery Deep Mine. Pillar recovery plans have been designed, and a preliminary study on a multi-lift longwall system has been completed in cooperation with the U.S. Bureau of Mines. Many questions still remain unanswered in both these plans; however, until such time that these questions can be satisfactorily answered, alternative recovery plans can not be implemented for the following reasons:

1. The top coal left in the existing mine is a substantial support member. Additional recovery of top coal could produce hazardous mining conditions and unusual caving patterns, due to the highly-jointed sandstone above the coal seam.
2. The Ferron Sandstone Formation is an aquifer in the area. The effects of major caving, caused by additional recovery, on the aquifer horizons, are unclear.

3. The Emery coal may be prone to spontaneous combustion and further planning and engineering design on the control and monitoring of spontaneous combustion must be completed.

If advanced technology becomes available to increase the recovery while maintaining high safety standards, Consol will modify the mining plan accordingly.

It should be emphasized that the abandonment of the Emery Deep mine will have no effect on the surface of the lease. The abandonment plan below is the current commitment by Consol to restore the surface facility area to approximately the premining condition.

At the conclusion of all underground mining activity, existing haulage, belt, and fan portals will be sealed using concrete block walls, backfilled with dirt, recontoured and seeded.

All buildings, power facilities, and ventilation systems will be removed from the mine site, (not located in U5287 lease surface) and their component parts moved to other locations for sale, salvage, or reuse. Once this is accomplished, surface grading will be performed as necessary.

All the major highways in the Carbon-Emery County area of Utah are subject to a considerable amount of daily automobile traffic all year round. However, the greatest portion of the traffic on Highway 10, connecting many Castle Valley towns with Price, is due to the fact that this is the only major highway accessible to commuting workers.

Production Capability Analysis

The Emery Deep mine is another one of the many mines located in the Uinta Coal Region where the company is faced with the mining of a coal seam 20 or more feet in thickness. However, recent drilling has indicted that most of the seam with 20 ft. of continuous coal has been mined out. Consol's solution, the same one used in the majority of the thick-seam mines, is to take a single 10 to 12-foot thick pass and to leave the remainder of the coal in the seam unrecovered. Because the I-Zone seams do split, making all but two or so horizons mineable, along with the recently implemented partial pillar recovery techniques, the overall recovery of the mineable seam should approach 40%.

Other than the necessity of dealing with the seam splits, the company does not expect any adverse mining conditions. The roof rock, although a shale, is considered to be highly competent. Mine support will be provided by proper roof bolting and conventional support.

The projected annual production rate of 1.7 million tons is reasonable considering the area of the lease and the surrounding fee reserves. The peak annual production will require 7 continuous miner units. Each unit should produce approximately 240,000 tons per year, for 250 days at 14 unit shifts per day. This will require a productivity of 480 tons per unit shift.

There will be no surface environmental impact on this lease because the seam will be mined from existing workings on fee land. Because of the 400 to 900-foot depth of cover for the mine it is not anticipated that subsidence will result in surface disturbance.

Diligent Development Analysis

Once the mining plan is approved, it is expected that the company will move quickly to put the lease into production. The lease should be in production by 1986 and the company in compliance with the requirements for diligent development and continuous operation.

STATE: UTAH REGION: UINTA COUNTY: EMERY

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
EMERY DEEP	CONSOLIDATION COAL	1	U.G.

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	I ZONE							
FORMATION								
RANK								
THICKNESS	6-24'							
Btu/LB	12,498							
SULFUR (%)	0.96							
ASH (%)	9.3							
MOISTURE (%)	3.8							
FIXED CARBON (%)	47.9							
VOLATILE (%)	39.0							
SEAM DEPTH								
IN-PLACE RESERVES	17.3							
RECOVERABLE RESERVES	8.198							
RECOVERY RATE	50							

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			17.3	M.P
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			8.198	M.P

NOTES: COAL PRONE TO SPONTANEOUS COMBUSTION

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah **REGION:** Uinta **COUNTY:** Emery

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Emery Deep	Consolidation Coal Co	U5287	720.0	720.0		U.G.	Submitted M.P.	0.7

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 8.198

SOURCE: M.P.

ASSOCIATED LEASES WITH REASONS WHY:

All Figures Shown in Million Tons

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: UTAH REGION: UINTA COUNTY: EMERY

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	DATE MINE OPENED: 1981 PROJECTED CLOSING DATE: 1995 REMAINING MINE LIFE: 14
EMERY DEEP	CONSOLIDATION COAL	1	

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY 0.6

RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981	0.73		
1982	0.98		
1983	1.175		
1984	1.425		
1985	1.679		
1986	1.7		
1987	↓		
1988			
1989			
1990			
Post 1990			

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

2B, #2

HIAWATHA COMPLEX
UNITED STATES FUEL COMPANY
MAP LOCATION U - 12
FEDERAL COAL LEASES SL025431 (2370.26 Acres)
SL069985 (2356.09 Acres)
U026583 (1000.00 Acres)
FEE LAND (9400.00 Acres)
EMERY COUNTY, UTAH

The properties of the United States Fuel Company are located on the eastern slope of the Wasatch Plateau near the towns of Hiawatha and Mohrland, Utah. The established LMU involves 15,126 acres of combined fee and government lease rights which are situated in both Carbon and Emery Counties.

The United States Fuel Company is owner of all the fee land and the federal government is owner of all the lease land described in this LMU. There are no other surface or subsurface owners.

The coal properties of U.S. Fuel Company are located in the Wasatch Plateau coal field along its rugged eastern face. The plateau consists mainly of shale and sandstone beds which, depending on resistence to erosion, form alternating tiers of cliffs and steep slopes. The local beds dip approximately 100 feet per mile to the southwest.

The stratigraphy of the Hiawatha-Mohrland area consists of the four distinct formations described below.

Masuk Shale Member of Mancos Shale: This is the uppermost member of the Mancos Shale. It varies from 600 to 1,100 feet thick and forms steep blue colored slopes where it is exposed near the town of Hiawatha.

Star Point Sandstone: The Star Point Sandstone rests on the Mancos Shale. It is a prominent white cliff-forming sandstone which acts as a marker bed for the coal-bearing horizons of the overlying Blackhawk Formation. Thickness is from 200 to 450 feet.

Blackhawk Formation: This formation consists of massive sandstone beds with shale and coal. It contains all of the coal beds discussed in this plan and ranges between 700 to 1,100 feet thick.

Price River Formation: The Price River Formation is comprised mainly of sandstone. Its Castle Gate Member, which lies at the base, is an easily traceable cliff-former. Thickness of this formation is from 700 to 1,200 feet.

Structure

The only fault of any consequence in the area covered by this report is the Bear Canyon Fault, which effectively defines the western edge of the U.S. Fuel Company property. It is a major normal fault which strikes almost due north and dips 85° west. Displacement is reported to be 250 feet in the west wall of Bear Creek Canyon. Other than minor displacements associated with the Bear Canyon Fault, there are no other significant faults in the area. Major folding in the area is absent, although numerous local "rolls" have been encountered.

Coal Beds

Four coal seams of economic potential are known to exist in the Hiawatha-Mohrland area. At the U.S. Fuel Company's King mines, these beds have been referred to as the Hiawatha, the A and B seams, and the Upper seam.

The lowermost is the Hiawatha seam. It rests immediately on top of the Star Point Sandstone and is traceable throughout the entire area. It varies in thickness from a few feet in the northern part of the property, where it is divided by rock splits, to over 10 feet of solid clean coal in some areas near Mohrland. It has been the main coal-producing bed in past years.

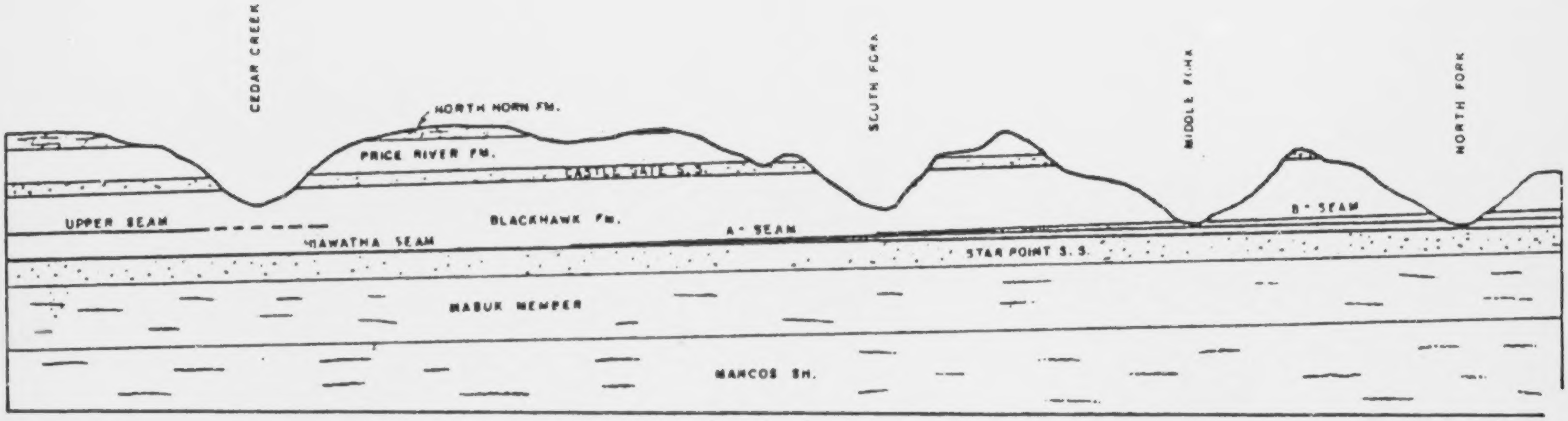
CEDAR CREEK
NORTH HORN FM.
PRICE RIVER FM.
UPPER SEAM
BLACKHAWK FM.
HIAWATHA SEAM
A - SEAM
SOUTH FORK
MIDDLE FORK
NORTH FORK
B - SEAM
STAR POINT S. S.
MASUK MEMBER
MANCOS SH.

Figure U-8-1. Generalized Cross Section United States Fuel Company (after U.S. Fuel).

The A seam is the next seam above the Hiawatha. It reaches a mineable height only in the northern part of the LMU where its thickness averages about six feet. The rock interval between the A and Hiawatha seams averages about 40 feet.

The B seam lies approximately 40 feet above the A seam. It also is mineable only in the northern part of the area. Its thickness ranges from 8 feet in the northwest corner of the property to 6 feet near the Old South Fork portal.

The Upper seam has been encountered by core drilling in the Mohrland area. It lies approximately 330 feet above the Hiawatha seam, and averages six feet thick.

Coal seam heights, reserves, and quality are not published by U.S. Fuel Company, nor could these data be secured through the appropriate OSM office in Denver, Colorado. Estimated heights are based upon those seams occurring on bordering lands leased and mined by Plateau Mining Company (SL031286 and U13097). Plateau is currently mining the three seams that also underlay the contiguous leases owned by U.S. Fuel.

The table below lists these mineable seams and labels them as the two companies do:

United States Fuel Company		Plateau Mining Company	Average Height (feet)
B seam	=	Wattis	8
A seam	=	3rd bed	6
Hiawatha	=	Hiawatha	10

At the present time, it appears that three mines in addition to the currently operating King 4 Mine, can be developed within the property limits of this plan. Following is a description of existing and proposed operations. It is naturally assumed that unforeseen safety, economic, or geologic factors could substantially change these proposals.

King 4 Mine

B Seam

Production from this mine began in the summer of 1975 when new portals and surface facilities were completed in Middle Fork Canyon.

There are five operating sections in 1978, each utilizing the room and pillar method with continuous miners. The conveyor haulage system as of 1978 was not adequate to handle all the northern part of the property when it is divided by rock splits, to over 10 feet of solid clean coal in some areas near Mohrland. It has been the main coal producing bed in past years.

The A seam is the next seam above the Hiawatha. It reaches a mineable height only in the northern part of the property where its thickness averages about six feet. The rock interval between the A and Hiawatha seams averages about 40 feet.

The B seam lies approximately 40 feet above the A seam. It also is mineable only in the northern part of the area. Its thickness ranges from eight feet in the northwest corner of the property to six feet near the Old South Fork portal.

An Upper seam has been recently encountered by core drilling in the Mohrland area. It lies approximately 330 feet above the Hiawatha seam, and averages 6 feet in thickness.

The King 5 mine, utilizing the same mining method as the King 4 mine will also share the same surface facilities. Production began on the B seam and is expected to continue until 1987 when the B seam will be mined out under the current mine plan. The A seam is expected to be mined when the B seam is mined out, production for the mine is anticipated to be around 300,000 tons per year. Access to the A seam is anticipated to be either from a separate portal or through the B seam from rock tunnels.

The Mohrland mine production is to begin on fee lands where its separate surface facilities are located and to eventually move into Federal lands. Production is to first be by room and pillar methods in the Hiawatha seam using continuous miners and belt haulage systems to move the coal to the surface. Production is expected to be taken over by a longwall system if conditions are favorable. Full production of the mine is anticipated to exceed 1,000,000 tons per year.

The South Form mine will continue the development of the Hiawatha seam. From previous mining, the A seam has been mined out 40 feet above the Hiawatha seam. This may leave no other alternative than to use a longwall system to provide adequate and safe roof conditions for the miners. Development is expected to begin during 1982 and is to continue until 1997. Production from this mine is anticipated to be 500,000 tons per year.

Production estimates for the above mines are based upon the premise that a market will be available for the anticipated 2,600,000 tons per year.

Surface facilities are not expected to be constructed on Federal land, however, if they are, the reclamation of the area is anticipated to be according to the established laws.

Production Capability Analysis

There are several conditions present at U.S. Fuel Company's Hiawatha complex. Most importantly, the complex contains 4 seams which are quite variable in thickness depending upon location on the property. The principal seam, the Hiawatha, is the lowermost seam on the property. Approximately two-thirds of the total recoverable reserve for the LMU are located in this seam. Because of its location in the seam sequence and the potential for adverse effects from subsidence if the Hiawatha is mined before the overlying seams, mining activity on this seam has been scheduled primarily for the time period from 1982 to 1997.

Whereas the Hiawatha seam reaches its maximum thickness of 10 feet in the southern portion of the LMU and gradually thins out in the northern portion, the A and B seams are at their thinnest in the southern extremes of the property and gradually thicken to the north. Production from the B seam, the uppermost of the 3 seams is ongoing in both the King 4 and King 5 mines and continue until reserves are exhausted in the 2 mines in 1988 and 1987, respectively. Production from the A seam in each of these mines will begin when the B seam operations conclude and will continue until the year 2001 in the King 4 mine and until 1993 in the King 5.

The Upper seam is separated from the Hiawatha seam by 330 feet of sandstone so it is well protected from any possible effects of subsidence caused by the mining of the other 3 seams. It is currently scheduled for mining from 1981 through 1992.

At the present time the company is planning on the use of continuous miners for the extraction of all the reserves in the Hiawatha complex. Seam development in all of the mines is based on the use of 6 entries. These entries are driven to the limit of the panel and the bulk of the reserves in a panel are pulled on retreat. The number of continuous miners assigned to a panel at a point in time is determined by the production rate assigned to the panel.

Consideration is being given to the use of longwall mining for the A and Hiawatha seams. The A seam appears amenable to longwall because of the necessity to mine under mined out workings and because of the thinness of this seam. By using longwall, all of the mined out areas in the A seam can be caved uniformly and thereby avoided the need to superimpose panel development on the old, erratic workings located in the overlying B seam. Longwall is attractive for the Hiawatha because of the constancy and quality of the reserves found in this seam.

Coal is gathered by conveyor from the different mines and moved through both new and old underground workings to a single point on the surface across Cedar Creek Canyon from the abandoned King 2 portal. The coal is then transported by an overland conveyor to a train loading facility located near the old Mohrland town site.

Environmental impact of the Hiawatha complex is primarily limited to the mine surface buildings and the conveyor transportation facilities. Since there are no coal preparation facilities, there is no problem of disposing of the reject material produced by such a plant.

The King 5 mine, utilizing the same mining method as the King 4 mine will also share the same surface facilities. Production began on the B seam and is expected to continue until 1987 when the B seam will be mined out under the current mine plan. The A seam is expected to be mined when the B seam is mined out, production for the mine is anticipated to be around 300,000 tons per year. Access to the A seam is anticipated to be either from a separate portal or through the B seam from rock tunnels.

The Mohrland mine production is to begin on fee lands where its separate surface facilities are located and to eventually move into Federal lands. Production is to first be by room and pillar methods in the Hiawatha seam using continuous miners and belt haulage systems to move the coal to the surface. Production is expectetd to be taken over by a longwall system if conditions are favorable. Full production of the mine is anticipated to exceed 1,000,000 tons per year.

The South Fork mine will continue the development of the Hiawatha seam. From previous mining, the A seam has been mined out 40 feet above the Hiawatha seam. This may leave no other alternative than to use a longwall system to provide adequate and safe roof conditions for the miners. Development is expected to begin during 1982 and is to continue until 1997, production from this mine is anticipated to be 500,000 tons per year.

Production estimates for the above mines are based upon the premise that a market will be available for the anticipated 2,600,000 tons per year.

Surface facilities are not expected to be constructed on Federal land, however, if they are, then the reclamation of the area is anticipated to be according to the established laws.

Diligent Development Analysis

Current indications are that the Hiawatha complex will be mined out in approximately 20 years. If this is in fact the case, then there will be no question concerning compliance with the requirements for diligent development and continuous operation. There are no indications that the U.S. Fuel Company is attempting to obtain additional reserves to prolong the life of the complex.

STATE: UTAH **REGION:** UINTA **COUNTY:** EMERY

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
HIAWATHA COMPLEX (KING 4,5, MOHRLAND AND SOUTH FORK MINES)	UNITED STATES FUEL CO	SL025431	15,126	2,370.26	9,400.0	U.G.	Approved 12-11-75	3.0
		SL069985		2356.09				
		U026583		1,000.0				
				5726.35				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 33.6

SOURCE: IC

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

535

STATE: Utah REGION: Uinta COUNTY: Emery

MINE NAME (OR LEASE BLOCK): Hiawatha

LESSEE(S) (OR OPERATOR): U.S. Fuel Co

NUMBER OF LEASES IN BLOCK OR PLAN: 3

MINING METHOD: U.G.

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	UPPER SEAM	B	A	HIAWATHA				
FORMATION	BLACKHAWK	→	→	→				
RANK								
THICKNESS	6'	6-8'	6'	3-10'				
Btu/LB		12,182	12630 *	12656 *				
SULFUR (%)		0.6	.4	.77				
ASH (%)		9.0	5.2	7.7				
MOISTURE (%)			7.2	4.7				
FIXED CARBON (%)			47.2	45.9				
VOLATILE (%)			40.4	41.4				
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL			33.6	IC
	SURFACE				
	UNDERGROUND				

NOTES: BEAR CANYON FAULT - 250 ft. VERTICAL DISPLACEMENT - DEFINES WESTERN EDGE OF PROPERTY

* ANALYSIS FROM ACLDS

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah **REGION:** Uinta **COUNTY:** Emery

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	
Hiawatha	U.S. Fuel Co	3	DATE MINE OPENED: 1975 PROJECTED CLOSING DATE: 2001 REMAINING MINE LIFE: 21

REMAINING RECOVERABLE RESERVES:
FEDERAL:
NON-FEDERAL:

MINE DESIGN CAPACITY
RECOVERY RATE: 40

CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION: 0.768 ACLDS

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	1.0		
1981	1.0		
1982	1.0		
1983	1.0		
1984	1.0		
1985	2.0		
1986	↓		
1987			
1988			
1989			
1990	2.0		
Post 1990			

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

HUNTINGTON CANYON NOS. 4 AND 5
SWISHER COAL COMPANY
MAP LOCATION U- 13
FEDERAL COAL LEASE - SL064903 (160 Acres)
U33454 (440 Acres)
SL050641 (160 Acres)
FEE LANDS(720 Acres)
EMERY COUNTY, UTAH

The Huntington Canyon No. 4 and No. 5 Mines are located within the Manti-LaSal National Forest, Price Ranger District, approximately 12 miles west-northwest of Huntington, Utah.

Surface ownership is shown to consist of purchased land, Federal land and land leased from H. Fleischhacker and the Madden Family.

The general area of the subject leases is on the Wasatch Plateau, a transitional zone between the complex Basin and Range Province to the west and the simply flat-lying rock of the Colorado Plateau to the east.

The various rock formations in the general area consist of a sequence of essentially flat-lying sedimentary rocks: sandstones, limestone, and shales, which display such sedimentary structures as interbedding, crossbedding, scour, and fill structures, flute casts, and lenticular bodies.

The rock formations dip less than 5°SW. There are large faults in the area. Slumps occur naturally within the Huntington drainage; however, there are no known zones of slumping in the immediate vicinity. Rockfalls occur naturally, but can be more frequent with activities associated with mining.

Overburden ranges from a minimum of 250 feet to a maximum of 2,000 feet. It has been observed that the undermining of areas of thin cover may tend to increase the effects of subsidence.

The coal seams of economic interest in the Huntington No. 4 Mine are: the lower seam called Hiawatha, which lies directly above the contact of the Blackhawk and the Star Point Sandstone and ranges in thickness from 6 to 8 feet; the upper or Blind Canyon seam, which lies about 85 to 90 feet above Hiawatha and varies in thickness from 10 to 13 feet, and the Castle Gate "A" seam, which will be mined by the Huntington No. 5 and has an average thicknesss of 9 feet.

There is currently a question as to the total extent of reserves for the Huntington No. 4 and No. 5 mine. Therefore, reserve estimates cannot be quoted.

Approximate analysis of coal from the Huntington No. 4 and No. 5 Mines is as follows:

Rank	Bituminous
Moisture	5.4 - 7.2%
Ash	5.9 - 6.5%
Sulfur	0.45 - 0.56%
Volatile Matter	41.3 - 43.7%
Fixed Carbon	44.6 - 44.9%
Heat Value	12,000 - 13,000 Btu/lb

In the Huntington No. 4 mine mining will start with extending entries in the Leamaster mine which is in the upper seam (Blind Canyon seam). Swisher plans to drive sets of five main entries to the property boundaries. Panels will be driven off the entries on retreat. Panels will extend to property boundaries, coal burn lines, barrier pillars or to lines where coal thins to unmineable thickness. Room pillars, entry pillars and barrier Pillars will be recovered as mining retreats for the outer limits. Mining in the lower seam, the Hiawatha seam, will start in

1984 and will proceed under mined out Blind Canyon seam areas. All Hiawatha seam entries will either underlie Blind Canyon entries or underlie panels with Blind Canyon pillars left in place. Overall recovery would be about 43 percent of in-place coal. Swisher projects similar recovery of the Hiawatha seam on the new lease. Recovery of 45 percent of in-place reserves would be acceptable from a resource use point of view.

Mining will be stopped when the seam thins to a certain unstated thickness. There is an area of about 100 acres in the Blind Canyon seam where Swisher intends to leave all coal in place because of thinness. This thin coal area can be mined from the outcrop in the future. However, mine plans should give minimum and maximum mineable thicknesses and criteria for limiting mining in burned or oxidized zones near the outcrop.

In the Huntington No. 5 Mine, mining will be done by the room and pillar method. Development entries will be driven on 80-foot centers, using a 5 entry set for advancing to the extremes of the property. Rooms will be developed on 60- or 80-foot center depending on the depth of cover (overburden) in the given area. Total pillar extraction will be done in the roomed out areas. Protective barrier pillars will be left on either side of the main entries from 150 to 500 feet wide, again depending on the depth of cover.

Main entries will be driven to the extremes of the properties on development and butt entries will be driven at right angles off the mains. Rooms will be driven off the butt entries and pillar extraction will take place in the room areas. Barrier pillars and chain pillars in the mains will be extracted on final retreat.

Reclamation for the Huntington No. 4 and No. 5 Mines will follow the closure of the mines and be conducted according to prescribed regulations.

Production Capability Analysis

With the exception of depth of cover, mining conditions in the Huntington Canyon No. 4 and No. 5 mines are nearly ideal. The 3 mineable seams range in thickness from 6 to 13 feet and are quite constant in their physical characteristics throughout the LMU. The sandstones, limestones, and shales which overlie and underlie the different seams are very competent and, as a result, provide above average roof and floor conditions. These factors, together with the absence of faulting that is charateristic of the Book Cliffs coal deposits, enable the company to operate with an exceptional underground productivity rate of 35 tons per man shift.

Because of the conitinuing threat of subsidence, the underground facilities for Huntington Canyon No. 4 in the Blind Canyon and Hiawatha seams and the Huntington Canyon No. 5 in the Castle Gate "A" seam have been laid out so that they are superimposed over one another. With this technique, secondary recovery of pillars in the mined out areas can proceed without endangering life-of-mine facilities such as haulage ways and main entries. The final recovery of barrier pillars along these more permanent facilities will be the final act prior to the closing of the mines.

The planned recovery rate of 45 percent can be considered as acceptable given the depth of cover of up to 2000 feet. However, the conditions present in the 2 mines make them ideal candidates for longwall mining. With longwall, it might have been possible to increase the recovery rates in excess of 70 percent and to have reduced the unit mining costs.

A major factor the company has to contend with is the difficulty of moving the coal from the minemouths to the railhead. The mines are located in very rugged and remote country at an elevation of over 9200 feet. The initial transportation mode is truck haulage over a 36-mile distance to the coal preparation plant located at the nearest railhead. This haulage is done in 45-ton bottom-dump and 30-ton end-dump trucks that must descend 2000 feet on roads with grades varying from 11 to 17 degrees. It is estimated that the trucks must make a combined total of 30,000 round trips a year to haul the 1,000,000 tons of production from the mines to the preparation plant.

Production in the mines is based on 2 continuous miners operating 2 shifts per day in each mine. This requires that each miner must produce a relatively conservative 500 tons per shift. With the lack of production obstacles and the very uniform conditions in the seams, there is no reason why this production rate cannot be maintained over the lives of the mines.

There are no significant environmental problems associated with the mines. The Forest Service has expressed concern over the steepness of the access road for the mines and the lack of erosion protection for some portions of the road. However, this issue is finally resolved should not have a significant effect on the ability of the mines to operate at their planned production rates.

Diligent Development Analysis

The current lack of information on recoverable reserves at the Hungtington Canyon Mines means that it is not possible to form any definite conclusions concerning the compliance of the mines with the requirements for diligent development and continuous operation. The maximum reserve estimates stated in the mine plan information indicate in-place reserves of approximately 15 million tons for the No. 4 mine. It would follow that No. 5 mine would have approximately one half that amount. If these numbers are anywhere the official estimates, then the LMU will be mined out well before the end of the allowed 40-year period.

STATE: Utah **REGION:** Uinta **COUNTY:** Emery

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Huntington Canyon No.4 and No.5	Swisher Coal Co.	SL 064903	1480	160	720 ①	U/G	Approved 1-28-80	1.32
		SL 050641		160				
		U 33454		440				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 20.0

RECOVERABLE: 10.0

SOURCE: M.P

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

① Unspecified tracts of fee land

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah REGION: Uinta COUNTY: Emery

MINE NAME (OR LEASE BLOCK): Huntington Canyon No.4 and No.5

LESSEE(S) (OR OPERATOR): Swisher Coal Co.

NUMBER OF LEASES IN BLOCK OR PLAN: 3

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Castlegate A	Blind Canyon	Hiawatha					
FORMATION	Black Hawk	→	→					
RANK	hv Bb	→	→					
THICKNESS	9'	10'-13'	6'-8'					
Btu/LB	12686		12118					
SULFUR (%)	0.45		0.56					
ASH (%)	5.9		6.5					
MOISTURE (%)	5.4		7.2					
FIXED CARBON (%)	44.9		44.6					
VOLATILE (%)	43.7		41.3					
SEAM DEPTH	250'-2000'							
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			20.0	M.P
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			10.0	M.P

NOTES:

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah **REGION:** Uinta **COUNTY:** Emery

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	
Huntington Canyon No.4 and No.5	Swisher Coal Co.	3	DATE MINE OPENED: 1976 PROJECTED CLOSING DATE: 1995 REMAINING MINE LIFE: 15

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY 1.32

RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	0.4		
1981	0.4		
1982	0.45		
1983	0.45		
1984	0.5		
1985	0.5		
1986	0.54		
1987	0.54		
1988	↓		
1989			
1990	0.54		
Post 1990	2.7		

NOTES: Production and reserve estimates unreliable due to newly issued lease U33454 and conflicts in estimates of reserves.

All Figures Shown in Million Tons

PRODUCTION SUMMARY

21A, #1

TRAIL MOUNTAIN MINE

Trail Mountain Coal Company
Map Location U- 14
Federal Coal Lease: U082996 (80.0 acres)
Emery County, Utah

The Trail Mountain Mine is a small producer of steam coal located in the Orangeville area of central Utah, Emery County. The entire logical mining unit (LMU) contains approximately 140 acres, 80 in Federal Lease U082996 and 60 in private ownership. Mining has currently started on the Federally leased lands advancing from the 60-acre tract owned by Mr. John Bell, owner and operator of the Trail Mountain Coal Company.

The 80-acre Federal coal lease was granted to Mr. Bell in April, 1974 to expand his operations and includes nearby coal resources. According to the mining plan approved by the Utah USGS office, mining on Federal Lease U082996 uses conventional room-and-pillar methods. It should be noted that this lease is small, and Trail Mountain Coal Company is also small; yet this operation can maximize recovery by its very nature. Diligent and continuous development of this lease can easily be met with little capital investment and manpower requirements.

The commercial coal beds occur in the Blackhawk Formation, which is the middle unit of the Mesaverde group of Late Cretaceous Age. The Blackhawk Formation, consisting of sandstone, shale, and coal seams, ranges from 700 to 900 feet thick. The most persistent and economically important coal seams in the district are the Hiawatha seam, which lies at the base of the Blackhawk Formation, and the Blind Canyon seam, occurring from 75 to 125 feet above the base of the Blackhawk.

At the leasehold the structure is evidently simple. No significant faults have been encountered in nearby mining. Bedding within the tract strikes north-northwest and dips west-southwestward at about 3 1/2 percent.

Nine sections of the targeted Hiawatha seam within about one-half mile of the Federal leasehold ranges in thickness from 3.9 to 9 feet, and averages 7.5 feet. A core hole drilled in 1975 about 1 mile north, at Roans Canyon, penetrated 8.9 feet of coal in the same seam. No other seams in the area are known to contain coal more than four feet thick in mineable quantities.

At the Trail Mountain mine, where the Hiawatha seam is exposed by highwall and entry areas, the seam is made up of commonly banded, bright and dull coal; fusain is sparse, and resin is rare. Locally, irregularly shaped dikes of very tough fine-grained clay sandstone crosscut the seam, but partings of rock or impure coal are very rare. Non-banded (cannel) coal does not appear to be present in the seam. The roof varies laterally from a fine-grained sandstone up to ten feet or greater to a thinly bedded sequence of interstratisfied siltstone, shale, and coal up to ten feet thick.

As received, the combined average of the assays of four samples of coal obtained from mine-run in 1976, and of three face samples of freshly exposed coal taken in 1975-1976, was 4.69 percent moisture, 8.38 percent ash, 39.64 percent volatile matter, 47.28 percent fixed carbon, 0.57 percent sulfur, and 12,517 Btu/lb (files of the District Geologist, Salt Lake City, Utah). Standard deviations among the data, respectively 0.67, 2.41, 1.53, 1.72, 0.02, and 400, indicated good consistency among the samples. On a dry mineral-matter-free basis this composite sample is 50.90 percent fixed carbon and 45.10 percent volatile matter; on a moist, mineral-matter-free basis, it yields 13,778 Btu/lb and ranks as a high-volatile B bituminous coal.

The depth of cover ranges from less than 100 feet near the outcrop in the northeastern part of the tract to a maximum of about 500 feet on the west.

Production Capability Analysis

The Trail Mountain mine was conceived and has continued to operate with the relatively small production rate of around 100,000 tons per year. The coal is of high quality and mining conditions appear to be good. There has been continuing attempts by the owners to obtain additional Federal reserves to justify expansion of the current production rate. A production goal given by the company is 1 million tons per year.

With the exception of a lease modification which doubled the existing Federal lease acreage from 40 to 80 acres, the government has not provided the additional reserves which the company is seeking. However, the June 1980 issue of Mining Congress Journal contained a press release which stated that the Trail Mountain Coal Company had signed 15-year agreements with Nevada Power & Light and Beaver Creek Coal Company to supply them with 300,000 and 120,000 to 150,000 tons of coal annually, respectively. The production level required to support these deliveries would exhaust the identified recoverable reserves in little more than one year.

The room and pillar mining system used at Trail Mountain can readily be expanded to support the higher production rate. The current rate of 100,000 tons per year can be obtained with a single continuous miner unit. The 420,000 to 450,000 tons-per-year rate required by the announced sales can be obtained using 2 continuous miner units, 2 shifts a day, 5 days a week.

Environmental impact from the mine is limited to disturbance of the surface in the general area of the portal for construction of support buildings and truck loading facilities. There is no indication that mine water discharge has created any environmental problems. Surface disturbance resulting from subsidence should be minimal considering the depth of cover and the relative thinness of the coal seam that is being extracted.

Diligent Development Analysis

Based on the currently identified reserves, the company will have no difficulty meeting the requirements for diligent development and continuous operation. The company's problem at this time is to obtain the reserves required to support market commitments.

23A, #1

All coal is conveyed from the mine to a stockpile for truck loading. Trucks and trailers transport the coal 40 miles to Wellington, Utah where it is shipped out by rail. The trucks use the existing road through Cottonwood Canyon to State Highway 29, through Orangeville and Castle Dale, to State Highway 10. State Highway 10 merges with Interstate 70 through Price to Wellington, Utah.

STATE: Utah **REGION:** Vinta **COUNTY:** Emery

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Trail Mountain	Trail Mountain Coal Co.	U082996	140	80 ①	60	U/G	Approved 1-26-78	0.075

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 0.2

SOURCE:

M.P.

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

Lease application U32046 still pending

COMMENTS:

① U082996 - original lease - 40 acres
modified lease - 80 acres (40 acre increased

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah
REGION: Uinta
COUNTY: Emery

MINE NAME (OR LEASE BLOCK): Trail Mountain
LESSEE(S) (OR OPERATOR): Trail Mountain Coal Co.
NUMBER OF LEASES IN BLOCK OR PLAN: 1
MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Hiawatha							
FORMATION	Blackhawk							
RANK								
THICKNESS	3.9'-9							
Btu/LB								
SULFUR (%)								
ASH (%)								
MOISTURE (%)								
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			0.2	M.P

NOTES:

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah **REGION:** Uinta **COUNTY:** Emery

MINE NAME OR LEASE BLOCK
Trail Mountain

LESSEE(S)
Trail Mountain
Coal Co

NUMBER OF LEASES
1

DATE MINE OPENED:

PROJECTED CLOSING DATE: 1987

REMAINING MINE LIFE: 7

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY .075

RECOVERY RATE:

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION: 0.045

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	0.05		
1981	0.06		
1982	0.06		
1983	0.075		
1984	0.06		
1985	0.06		
1986	0.05		
1987	0.05		
1988			
1989			
1990			
Post 1990			

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

18B, #1

WILBERG AND DEER CREEK MINES
UTAH POWER AND LIGHT COMPANY
MAP LOCATION U- 10

Federal Coal Leases

U01358 (320.0 acres)
U040151 (1,720.0 acres)
U083066 (2,485.0 acres)
SL064607 (613.92 acres)
SL070645 (2560.0 acres)
U084923 (2,252.42 acres)
U084924 (1,211.48 acres)
U044025 (40.0 acres)
SL064900 (160.0 acres)

EMERY COUNTY, UTAH

The Wilberg and Deer Creek Mines are located approximately 10 to 12 miles north-northwest of Castle Dale, Utah. Both mines were filed for under the Wilberg mining plan and operate on different seams. To be considered in the near future with the same mine is the Cottonwood Portal. This new portal would be located several miles to the west of the Wilberg Portal. The Cottonwood Portal was proposed to allow extraction of coal from the same seams, in an more efficient manner with greater safety.

Reserves for the entire mine plan in 1977 were given as 240,082,000 tons in-place and 120,041,000 tons of recoverable coal. The Cottonwood Portal does not expand the reserves of the mine plan but will allow a faster recovery of the reserves. Of the above total, the reserves for the Cottonwood Portal in the Blind Canyon seam are 52,572,000 tons in-place and in the Hiawatha Seam there are 26,646,000 tons in-place. A small portion of the reserves are located on fee lands, while the remainder is on Federal leases.

All of the coal is found in the lower one-third of the Blackhawk Formation in the upper or Blind Canyon seam and the lower or Hiawatha seam. The Hiawatha seam forms the basal unit of the Blackhawk Formation and is underlain by the massive Star Point sandstone.

Overburden on the Hiawatha seam ranges from zero at the outcrops to an average of 1,600 feet and is at a maximum of about 2,400 feet. This is made up of massive, medium-to-coarse-grained sandstone of the Castlegate Formation and lenticular sandstone, siltstone, and mudstones of the Blackhawk Formation.

Both the upper Blind Canyon seam and lower Hiawatha seam average about nine feet thick. A third seam, the Bear Canyon, is two to six feet thick and considered unmineable. It is separated from the Blind Canyon seam by 14 to 32 feet of sandy and silty strata.

The average quality of the combined coal seams is in the following ranges:

Moisture	5.0 to 8.3%
Ash	5.6 to 13.2%
Btu	11,400-12,900
Sulfur	0.51 to 0.55%
Fixed Carbon	43 to 49%
Violatile Matter	36 to 42%

Reported reserves as of February, 1980 by lease and by seam were indicated as follows for the Cottonwood Portal, in million tons.

	Blind Canyon	Hiawatha
U084923	24.621	2.035
U084924	13.847	19.193
U083066	9.497	13.827
SL070645	4.607	0.895
Fee Lands	-	0.696
TOTAL	52.572	26.646

Mining methods utilized in the Wilberg, the Deer Creek and the Cottonwood Portals are essentially the same. The Emery Mining Corporation has been designated as the operator for the above mines and is also the operater for the Des-Bee-Dove Mines.

The standard room and pillar mining method utilizing continuous miners is presently used in all portals for the extraction of coal. A six-entry main heading with openings 20 feet wide on 100-foot centers has been developed. The panel developments are opened on the advance with three entries; on the retreat, two entries are developed in conjunction with a maximum pillar recovery of 80 percent. All panel openings are 20-feet wide on either 80- or 100-foot centers. Since it is a multiseam operation, all workings are planned to be superimposed for better ground and roof control. The upper seam is to precede the lower seam in mining by 12 machine-months.

The longwall unit in the Deer Creek Portal, according to a January, 1980 Coal Age article, has been cutting an average of 10 feet 1 inch of the 12-foot-thick Blind Canyon Seam, with production averaging 2,500 tons per shift. The current panel being mined is experimental and measures 3,000 feet long and 500 feet wide. All other longwall panels are expected to be 5,500 feet long and 600 feet wide, where possible. In future passes of the longwall shearer, the thickness of coal to be taken is expected to increase to 11-feet at the mid-point of the face and to taper back to 10-feet near the end of the face. Monthly production from the Deer Creek Portal is currently 220,000 tons of which 115,000 tons is produced by the longwall operations. Emery Mining currently operates 8 continuous miner sections in the Deer Creek Portal, two continuous mining units are to develop future panels for longwall mining.

In the Cottonwood Portal, the longwall mining system planned is to be a retreating type operation. A working face of 480 feet is to be developed by continuous miners, then the longwall mining begins from the main entries of the portal leaving a barrier of 200 feet between the mined-out longwall panel and the main entries. Recovery from the longwall system is expected to be 80 percent or better.

A life of 34.5 years is expected for the Cottonwood Portal, with an annual production of 1,500,000 tons. To meet this production goal, 3 continuous mining units and 2 longwall units operating 2 shifts per day are required.

Mining of both the Blind Canyon seam and the Hiawatha seam is planned for the Cottonwood Portal. The Deer Creek and the Wilberg mines operate on the Blind Canyon Seai and the Hiawatha seam, respectively. To gain access to both seams from the Cottonwood Portal, 2 slopes and 3 shifts are to be developed. The slopes will have a grade of 3 percent and a length of 3,100 feet each. The shafts are to be developed by air intake and return and for belt transfer and surge capacity.

Problem areas in the mine were described in an October 1978 Coal Age article. The excessive cover over the mine area, 1,000 feet to 2,500 feet, has caused rib sloughing in the mine. The solution to the problem was to make the entries wider and let the slough occur; after it does occur, the problem should not arise again as long as the collapsed ribs are left in the entries. Water in the mine seemed to warrant mention. In the Deer Creek and Wilberg Mines about 200 pumps are utilized to keep the water out and the mine dry.

Production planned for each mine portal is as follows:

Deer Creek Portal	2,640,000 tons per year - Blind Canyon Seam
Wilberg Portal	2,200,000 tons per year - Hiawatha Seam
Cottonwood Portal (1983)	1,200,000 tons per year - Both seams

The production from the Wilberg mine is supplying the Utah Power & Light plants of Gadsby-Jordan at Salt Lake City, Utah; Hale at Orem, Utah; and the Carbon plant at Castle Gate, Utah.[1] The combined average consumption of the Emery 1 and 2 units is estimated to be some 2,000,000 tons/year. There are sufficient reserves in the Wilberg to supply the estimated 84,000,000 tons of coal required over the 35-year life of Emery units 1 and 2.[2] However, the Utah Power & Light Company has recently proposed to expand the Emery Power plant by constructing two additonal 430 MW units, Nos. 3 and 4. The combined average fuel requirements of these plants is two million tons of coal per year.

[1] FERC Form 423 Reports for Nov., 1977.

[2] EIS Emery 1 and 2.

Production Capability Analyisis

The Wilberg-Deer Creek-Cottonwood mine complex is scheduled to become Utah Power & Light's principal supplier of steam coal over the remainder of this century. Continued development and investment in the mines over the 10 years they have been under the utility's control has resulted in an underground mining complex that ranks with those found anywhere in the world.

There are several factors which have led UP&L to make this kind of commitment. Most importantly, is the sheer magnitude of the in-place reserves available on the LMU. This factor combined with others such as exceptional coal quality and mining conditions which are ideal for high-volume and low-cost mining methods such as longwalling, make it obvious as to why the company has pursued the development of the complex as a captive operation rather than choosing to purchase its coal on the open market.

Past operating records and demonstrated success in operating both continuous miner and longwall operations indicate that UP&L, and its contract mine operator, will quite probably be successful in achieving the prodution goals they have set. Planned production in all 3 of the mines is based on achieving continuous miner production rates of 500 tons per shift and longwall production of 1,250 tons per shift. These are both relatively conservative rates which have been readily achieved within UP&L's operations.

Mining plans and ultimate coal production tonnages for the LMU were historically based on the assumption of an overall recovery rate of 50 percent. Experience with longwall mining over the past one and one half years has led the company to think of extraction rates in excess of 80 percent for those portions of the mines where longwall extraction will be used. Since more than half of the production from the mines will ultimately come from longwalls, it is not unreasonable to expect an overall recovery rate for the complex as high as 65 percent. Assuming total in-place reserves on the order of 240 million tons, this means that total production from the complex will be approximately 156 million tons rather than the 120 million tons the company was planning on prior to the implementation of longwall mining.

There are no identified mining problems of such magnitude as to interfere significantly with current production planning. The limited faulting which is present on the LMU is primarily located between the mines. The mines were laid out intentionally so that this would be the case. Relatively high groundwater in-flow rates are present in the Wilberg and Deer Creek Mines. This situation is being controlled through the use of an extensive network of pumps. Ventilation, roof control and all other potential mine environmental problems are similarly being controlled through the use of appropriate preventive measures.

Environmental impact from surface facilities has been minimized. The mine portals are located high on the sides of narrow canyons. Coal handling facilities and access roads are located on ground that has been formed by cutting into the canyon walls. Mine support buildings and coal crushing and storage facilities are located on the valley floors below. The construction roads and conveyor benches has created interference with the normal surface drainage pattern. Various ditches and drainage culverts have been constructed to handle storm runoff. Other than that, there has been little disturbance of the surface.

Coal is transported from the mines to 2 UP&L power plants in the near vicinity. The Huntington plant is located approximately 2 miles northeast of the portal of the Deer Creek mine. The Emery plant is located approximately 20 miles south of the portals for the Cottonwood and Wilberg mines. Transportation of coal over both routes is by 48-inch conveyor belt. Because of the current requirements at the Huntington plant and the 4-phased expansion of the Emery plant which will expand its generating capability to 1.6 million megawatts in 1985, it is anticipated that the coal produced from the 3 mines will continue to go to these 2 power plants.

Diligent Development Analysis

Based on a planned production rate of 6 million tons per year for the LMU and estimated recoverable reserves of 156 million tons, the remaining life of the LMU is approximately 26 years as a whole. In actual fact, current plans call for the Cottonwood mine to extend beyond this period for a total life of 34.5 years. In either case, the total mine life and annual production rates planned for the mines in the complex place it in compliance with the requirements for diligent development and continuous operation.

There is no indication that UP&L is planning on seeking additional federal reserves for the LMU at any time in the near future.

STATE: Utah **REGION:** UINTA **COUNTY:** Emery

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Wilberg and Deer Creek Mines	Utah Power and Light Co.	U01358	11,362.82	320.00		U/G	Approved 1-20-78	6.04
		U040151		1720.00				
		U083066		2485.00				
		SL064607		613.92				
		SL070645		2560.00				
		U084923		2252.42				
		U084924		1211.98				
		U044025		40.00				
		SL064900		160.00				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 240.082
RECOVERABLE: 120.041

SOURCE: Mine Plan

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah REGION: UINTA COUNTY: Emery

MINE NAME (OR LEASE BLOCK): Wilberg and Deer Creek Mines

LESSEE(S) (OR OPERATOR): Utah Power and Light Co.

NUMBER OF LEASES IN BLOCK OR PLAN: 9

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Hiawatha	Blind Canyon						
FORMATION	Blackhawk	→						
RANK								
THICKNESS	9' ave	→						
Btu/LB	11,400-12,900	→						
SULFUR (%)	0.51-0.55	→						
ASH (%)	5.6-13.2	→						
MOISTURE (%)	5.0-8.3	→						
FIXED CARBON (%)	43-49	→						
VOLATILE (%)	36-42	→						
SEAM DEPTH	1600' (ave)							
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			240.082	
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			120.041	M.P

NOTES:

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah **REGION:** UINTA **COUNTY:** Emery

MINE NAME OR LEASE BLOCK Wilberg and Deer Creek Mines	LESSEE(S) Utah Power and Light Co.	NUMBER OF LEASES 9	DATE MINE OPENED: 1978 PROJECTED CLOSING DATE: 2013 REMAINING MINE LIFE:
REMAINING RECOVERABLE RESERVES: FEDERAL: NON-FEDERAL:	MINE DESIGN CAPACITY RECOVERY RATE: 50		CUMULATIVE PRODUCTION TO 1979: 1979 ACTUAL PRODUCTION: 1.871

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	3.6		
1981	5.26		
1982	5.49		
1983	6.0		
1984	6.1		
1985	6.2		
1986	6.3		
1987	↓		
1988	↓		
1989	↓		
1990	6.3		
Post 1990			

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

12A, #1

CONVULSION CANYON MINE
(SUFCO MINE NO. 1)
COASTAL STATES ENERGY COMPANY
MAP LOCATION U-18

FEDERAL COAL LEASE - SL062583 (2199.83 Acres)
U062453 (480.00 Acres)
U0149084 (240.00 Acres)
U28297 (2631.98 Acres)
FEE LANDS (640.00 Acres)

SEVIER COUNTY, UTAH

Southern Utah Fuel Co. (SUFCO), a subsidiary of Coastal States Energy Company, of Houston, Texas, operates the SUFCO Mine No. 1 in Convulsion Canyon, Sevier County, Utah. The mine is located near Salina, Utah, approximately 80 miles southwest of Price and covers four Federal coal leases. The surface and mineral ownership of this land is held by the Federal Government. An additional 640 acres of fee land is included in the LMU.

Coal occurs in the lower portion of the Blackhawk Formation of the Mesaverde Group. The Blackhawk Formation is overlain by the Price River Formation and underlain by the Star Point sandstone.

The Price River Formation is the uppermost competent sedimentary unit that is exposed in the vicinity of the mine. It consists of gray to white, gritty sandstone interbedded with shale and conglomerates. The basal member of this formation is the cliff-forming Castlegate sandstone.

The Blackhawk Formation consists of fine to medium grained sandstone interbedded with subordinate gray and carbonaceous shale containing several thick coal seams. In the mine area, one of those seams, the Upper Hiawatha, is mineable. In the northwest portion of the mine, it averages approximately 15 feet thick; to the southwest it thins to less than 5 feet thick.

The sediments near the mines are relatively undisturbed. They generally have a strike that trends roughly northeast and a shallow dip of about four degrees to the northwest. A few small faults, having apparent vertical displacement of about three feet or less. have been encountered in the mine workings. These faults strike N 10° W to N 15° W and are near vertical. However, the presence of fault structures has not significantly affected the mining operation.

The average coal analysis from the Upper Hiawatha seam sampled through the SUFCO mine is as follows:

Btu/lb	11,500
Ash	9.4%
Sulfur	0.6%
Fixed Carbon	44.0%
Volatile Matter	38.0%
Moisture	8.0%

It is estimated that the mineable coal reserves from the LMU are 80-90 million tons.

The SUFCO Mine is an underground coal mine located east of Salina, Utah. The, current rate of production is 1,650,000 tons per year, with a projected increase to 2,100,000 tons per year in the near future. The mine portal and attendant load out facilities are situated near the apex of a semi-arid incised canyon at an elevation of approximately 7,600 feet. Because the surrounding surface rises sharply above the service area, coal crushing and loading areas together with mine offices and equipment repair buildings are extremely compact. The total area for the surface operation encompases less than 15 acres. Access to the mine is provided by a paved road in excellent condition. Immediately beyond the mine service area, the canyon splits into three smaller fingers extending short distances to the northeast, north and northwest and to the top of the plateau. The amount of relief from the mine service area to the top of the plateau is 1500 feet. The topography rises about 1200 feet in approximately one-half mile immediately above and to the east of the main portal area.

Mined coal is brought to the surface by horizontal conveyor belt and is crushed and sized for immediate truck load out. All coal is transported from the mine by truck. Surface storage of coal is not a general practice, largely because stored coal must be loaded by a front end loader. Storage facilities for emergency short term coal storage are, however, provided for occasions when mine production exceeds the available trucking capacity.

Four mining methods could be used in the coal mining operation depending on the conditions and nature of the coal seam. These methods include: conventional and continuous room and pillar, long wall, and short wall mining. Coal is currently being mined by conventional and continuous miner units with room and pillar mining methods plus secondary recovery of pillars.

Immediately upon completion of mining, all lands disturbed by the surface facilities (10 acres) will be reclaimed diligently until completion. Drainage structures will be plugged or removed and rip-rapped channels constructed to control erosion. Steel and wood structures not appurtenant to drainage of the area will be removed within 12 months time. Portals will be closed within the first three months. Site will be scarified, sloped, and seeded before the next growing season. Grass will be maintained by fertilization or reseeding until stable up to five years.

The closure of the portals will follow USGS requirements which will be dependent upon the situation at the mine at the time of its abandonment.

Concrete foundations will be buried with fill material and covered with topsoil and disced.

15A, #1

Entire site will be reseeded with a mixture of seed such as mountain varieties of wheatgrass, hard fescue, and ladak alfalfa, or as specified bv the Forest Service.

About 1,000 feet of road exists on the lease at the mine. The company does not plan on closing the road or revegetating it since it is a public road used for recreation, livestock driving and fighting forest fires. At the time of abandonment, the road will be closed off if the regulatory authority so wishes.

Production Capability Analysis

Mining conditions in the SUFCO mine are fair to excellent. The Upper Hiawatha seam, the only mineable seam on the property, is essentially flat lying with an average thickness of 13 feet which is fairly constant over the extent of the LMU (with the exception of the southern one-third of lease U-28297 where the seam is split by a Paleochannel system). These factors with an absence of significant faulting and a competent sandstone to form the roof rock, provide the mining conditions to support above average rates of recovery at below average mining costs.

Coastal States has initiated mining at Convulsion Canyon using both conventional and continuous miner extraction in a room and pillar mining system. At the present time the company is expecting to obtain a 60 or 70-percent recovery rate in the panels. With additional secondary recovery of coal in the entry and barrier pillars, it whould be possible to obtain an overall mine recovery rate of 55 to 60 percent using a room and pillar system. However, the mining conditions described above appear to be amenable to supporting a longwall method of extraction which would result in an overall mine recovery rate in the range of 70 to 80 percent. Coastal States is currently studying the feasibility of changing over to a longwall system, at least partially, if conditions are as suitable as they appear to be.

Recoverable reserves in the LMU are in the range of 40 to 45 milliom tons. Based on a recovery rate in the range of 50 to 55 percent with the mining method currently being utilized.

Coal produced at the SUFCO mine is trucked either to local markets in Salina, Utah or to a rail loadout facility on the Union Pacific Railroad at Levan, which is 50 miles beyond Salina. The total haul distance from the mine to Levan is 80 miles, 10 miles of which is on a mine access road and the balance on Interstate 70 and state highways 98 and 28. Because this part of Utah is very sparsely populated, the 50,000 plus 40-ton truck trips that are required to accomplish this transport each year has not drawn public outcry.

The company has apparently been careful to protect the environment from the impact of mining operations. Total surface disturbance in the mine portal area has been limited to 15 acres. This has been accomplished by compactly organizing all the required surface facilities. The requirements for vehicle parking for employees has been largely eliminated by the use of company sponsored buses and van pools. Since the total hourly employment is approximately 250, this approach not only eliminates much of the parking that would otherwise be required but also minimizes the amount of air pollution that results from vehicle exhaust emissions.

It is expected that some subsidence will result from mining operations. However, if the company goes to a longwall system then the chances for differential subsidence and the resulting surface disturbance will be be minimized. The pillar recovery methods already in use have been designed to minimize subsidence. Even if fractures break through to the surface, the remoteness of the region makes it unlikely that this will have an impact on other activities.

Diligent Development Analysis

The question as to whether the company will meet diligent development and continuous operation requirements and be able to mine out the LMU in 40 years depends largely on what the recoverable reserves are. If they are 40 or 50 million tons, the 2.1 million ton annual rate will exhaust the reserves well within the 40-year requirement. If there are 80 or 90 million tons or more, then the 2.1 million-ton annual production rate will not be adequate.

STATE: Utah **REGION:** Uinta **COUNTY:** Sevier

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Convulsion Canyon Mine (SUFCO No.1 Mine)	Coastal States Energy Co.	SL-062583 U-062453 U-0149084 U-28297	6191.81	2199.83 480.00 240.00 2631.98	640.00	U/G	Approved 9-14-77	2.1

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 40-45

SOURCE: 1C

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah REGION: Vinta COUNTY: Sevier

MINE NAME (OR LEASE BLOCK): Convulsion Canyon Mine

LESSEE(S) (OR OPERATOR): Coastal States Energy

NUMBER OF LEASES IN BLOCK OR PLAN: 4

MINING METHOD: U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Upper Hiawatha							
FORMATION	Blackhawk							
RANK	Bit							
THICKNESS	5' - 15'							
Btu/LB	11500							
SULFUR (%)	0.6							
ASH (%)	9.4							
MOISTURE (%)	8.0							
FIXED CARBON (%)	44.0							
VOLATILE (%)	38.0							
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			40 - 45	1C

NOTES:

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah
REGION: Vinta
COUNTY: Sevier

MINE NAME OR LEASE BLOCK: Convulsion Canyon Mine
LESSEE(S): Coastal States Energy
NUMBER OF LEASES: 4
DATE MINE OPENED: 1941
PROJECTED CLOSING DATE: 2002
REMAINING MINE LIFE: 22

REMAINING RECOVERABLE RESERVES:
FEDERAL: 40-45
NON-FEDERAL:
MINE DESIGN CAPACITY 2.1
RECOVERY RATE: 50① [60-80 open source]
CUMULATIVE PRODUCTION TO 1979: 7.1
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980	1.8		
1981	1.83		
1982	1.87		
1983	1.9		
1984	2.0		
1985	2.0		
1986	2.1		
1987	↓		
1988			
1989			
1990	2.1		
Post 1990	25.2		

NOTES: ① estimate

Few faults with 3 foot displacement
Underground water seepage along faults

All Figures Shown in Million Tons

PRODUCTION SUMMARY

576

8A, #5

SKUMPAH CANYON MINE
ENERGY RESERVES GROUP INC.
MAP LOCATION U - 19

FEDERAL COAL LEASE: U0141177 (2,504.37 Acres)
SEVIER COUNTY, UTAH

Energy Reserves Group, Inc. has submitted for approval, a mining plan for an underground mine to produce 1,000,000 tons of coal a year from Federal and private lands.

The proposed minesite is located in northeastern Sevier County, near the mouth of Skumpah Canyon, a southwest trending tributary to Salina Creek. Access to the property is from Interstate Highway 70, via unimproved Forest Development Road 40009 which is also the primary proposed haul road.

The mine plan includes a total of 6,520 acres, 4,020 of which is in private ownership. The surface ownership is mostly in private ownership and is distributed as follows: 5,840 acres private surface and 680 acres Federal surface.

The proposed minesite lies on the rugged western slope of the southern Wasatch Plateau. Altitudes range from 6,970 at Salina Creek near the minesite to 8,613 feet on the high ridge between Skumpah Canyon and the Acord Lakes. Local relief above Salina Creek commonly axceeds 700 feet.

Exposed formations on the leasehold include, from bottom to top: the upper part of the 900- to 1,000-foot thick Blackhawk Formation, exposed along Skumpah Canyon and along the steep lower and middle slopes of the plateau; the 300-foot thick Castlegate Sandstone, which forms vertical cliffs above the middle of the slopes; and the 450-foot thick Price River Formation, which forms the gentler upper slopes and caps the plateau surface. Overburden ranges from 900 to 1,600 feet over much of the mine area, but may be as thin as 450 feet under Skumpah Canyon and 650 feet east of the Acord Lakes fault.

The Musinia fault zone contains normal faults, which are either vertical or steeply dipping to the west. Vertical displacements within the fault zone exceed 2,000 feet in this area and have brought the North Horn Formation (of the west block) down against the Blackhawk Formation. The north-northeast trending Acord Lakes fault is similarly a vertical or high-angle normal fault, down-faulted on the west. Vertical displacement along the fault is 300 to 400 feet, decreasing southwestward. Two minor northwest-trending faults, with postulated vertical displacements of about 20 feet each, are present within the block. A joint system, oriented at about N. 20° W., appears to be spatially associated with the faulting.

The Ivie coal bed has local extent within the lower part of the Blackhawk Formation. Drillhole data indicate that it forms an irregularly circular, lenticular body that is 14 feet or more thick and thins irregularly to 4 feet or less toward the project boundaries. Average thickness is 9 feet. The Upper Ivie coal bed has local extent 20 to 60 feet above the Ivie bed. Within the lease area, it ranges from 0 to 7 feet thick and is thickest between Skumpah Reservoir and the Acord Lakes.

Coal reserves within the lease area, to a minimum mining thickness of 4 feet, are estimated to be about 84,000,000 tons in the Ivie bed and 8,000,000 tons in the Upper Ivie bed. An additional estimated 19,000,000 tons of unleased coal are peripheral to and within the boundaries of the leased block. Some thin coal beds are within the lease area. They are economically mineable and the tonnage has not been estimated.

AVERAGE COAL QUALITY ANALYSIS

	Ivie Coal Bed	Upper Ivie Coal Bed
Btu/lb	11,042	11,674
Sulfur %	0.45	0.53
Ash %	12.3	7.1
Moisutre %	7.9	9.5

Initial production would begin by the 13th month of operations and full production would be reached by the 28th month. Mining will be on the room-and-pillar method, using continuous mining equipment supplemented by conventional drill-and-blast techniques. Access will be gained by driving an incline from the portal for 1,022 feet, at approximately 18° from the horizontal. This incline is expected to intersect the coal bed 313 feet below the portal at a bearing of N. 78° E., subparallel to Skumpah Canyon. Once the coal has been intersected, a main entry will be driven within it, at a bearing of S. 65° E.

The proposal calls for upgrading 2.7 miles of Salina Creek road (Forest Development Road 40009) on Federal lands to a width of about 40 feet and for constructing a one-third mile graveled or paved spur on company owned surface to the proposed surface facilities.

No market has been identified for the coal. Production would be hauled by trucks (approximately 25-ton payload) down the upgraded access road to Interstate 70, and then, depending on the market, could be hauled about 19 miles west to the Salina railhead, 30 miles east via I-70 and U-10 to Emery if the Castle Valley railroad is built and extended to Emery, or directly to market.

Coal will not be mined beneath the Acord Lakes and pillars will not be pulled in the vicinity of major faults. The mine will not extend east of the Acord Lakes fault should exploration show mining to be unsafe or uneconomical. Coal seams as thin as 4 feet will be mined if economically feasible.

11A, #5

The proponent's post-mining reclamation objective will be "to maintain an environmentally balanced system of preservation of the ecosystem present in the area, to prevent contamination of hydrologic zones and to reclaim any disturbed area as soon as possible. The removal of buildings and the placing of topsoil on any coal dust and reseeding should accomplish our main objectives after the mining operation is complete."

Source: Final Environmental Statement, Central Utah Coal, 1979.

STATE: UTAH **REGION:** **COUNTY:** SEVIER

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
SKUMPAH CANYON	ENERGY RESERVES GROUP, INC.	U0141177	6520	2504.37	4020	U.G.	INCOMPLT M.P.	2.0

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 85

RECOVERABLE: 41.0

SOURCE: EIS

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: UTAH REGION: UINTA COUNTY: SEVIER

MINE NAME (OR LEASE BLOCK): SKUMPAH

LESSEE(S) (OR OPERATOR): ENERGY RESERVES

NUMBER OF LEASES IN BLOCK OR PLAN: 1

MINING METHOD: U.G.

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Ivie	Upper Ivie						
FORMATION	BLACKHAWK	→						
RANK								
THICKNESS								
Btu/LB	11042	11 674						
SULFUR (%)	.45	.53						
ASH (%)	12.3	7.1						
MOISTURE (%)	7.9	9.5						
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND			82.0	EIS
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			41.0	EIS

NOTES:

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah REGION: Uinta COUNTY: Sevier

MINE NAME OR LEASE BLOCK: Skumpah

LESSEE(S): Energy Reserves

NUMBER OF LEASES: 1

DATE MINE OPENED: 1983

PROJECTED CLOSING DATE: 2028

REMAINING MINE LIFE: 45

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY 2.0

RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983	0.1		
1984	0.3		
1985	0.6		
1986	0.9		
1987	1.2		
1988	1.3		
1989	1.5		
1990	1.8		
Post 1990	2.0		

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

UTE #1 and #2
MOUNTAIN STATES RESOURCES COMPANY
(UTE ENERGY COMPANY - SUBLESSEE)
MAP LOCATION U - 20

FEDERAL COAL LEASES: U5135 (2,571.99 Acres)
FEDERAL COAL LEASE APPLICATIONS: U5136 (2,558.46 Acres)
U5137 (2,361.53 Acres)
U5138 (2,388.43 Acres)
U5146 (2,563.82 Acres)
STATE LEASES: (1,280.00 Acres)
FEE LAND: (1,400.00 Acres)

SEVIER COUNTY, UTAH

Mountain States Resources Corporation (MSRC) has applied for a preference right lease in Sevier County, Utah, under the Secretary of Interior's Short-Term Coal Leasing Criteria. The lease U5135 and lease applications U5136 to U5138 and U5146 cover 12,443.73 acres in the southern Emery coal field. The surface of the proposed lease area is in Federal ownership administered by the U.S. Forest Service (8,692.06 acres). The corporation has the mineral rights leased on 1,400 acres of private land in or near Paradise Valley and a state lease for 1,280 acres in T. 24 S., R. 5 E., secs. 16 and 32 under State lease number 25645. These private and State leases are adjacent to the proposed Federal lease areas.

The Federal leases are located adjacent to State Road 72 approximately six miles south of its junction with Interstate 70. The junction, known as the Fremont Junction, is approximately 35 miles east of Salina, Utah.

Coal will be developed from the Emery Coal Field. The major coal seams of this field occur in the Ferron Sandstone Member of the Mancos Shale consisting mostly of thick to thin resistant sandstone beds. The Blue Gate Shale Member overlies the Ferron and forms the upper part of the cliffs and much of the plateau. The Blue Gate Shale Member and, to a lesser degree, the Younger Masuk Member, contain appreciable amounts of poorly resistant shale and mudstone locally, and some beds are rich in swelling clay (see Figure 1). Extensive landslides exist near the mine, but no large slides are known within the mine area.

The Paradise Fault is a northward to northwestward trending vertical or high-angle normal fault, down dropped on the west; vertical displacements are not known but are presumably considerable. Several other faults have been discovered during reconnaissance mapping and preliminary drilling. They generally trend north and northwest, and have vertical displacements generally less than 100 feet. The north-northwest fault at the eastern boundary of the mine area is down dropped approximately 60 feet on the east.

The mine area is on a gentle anticlinal fold on the west limb of the north-plunging Dear Peak syncline. The average dip of coal beds and surface rocks is only about 3° north-west to northeast but higher dips are present near the south end of the mine area.

The seams considered are the "D" and overlying "E" seams of the lower part of the Ferron Sandstone Member. They are poorly exposed and generally thin along the Limestone Cliffs and within drainages that dissect the cliffs.

The "D" seam is not present at the portal nor in the northern part of the proposed workings. It appears as a featheredge in the central part of the proposed Ute No. 1 Mine workings and thickens to about 8 feet at the south end.

Above Last Chance Creek the overlying "E" seam is exposed at the portal site. It is one to 8 feet thick and widens and narrows irregularly. It is believed that most, if not all, mining in the No. 1 Mine will be in the "E" seam. The interval between the "D" and "E" seams is 20 feet at the approximate pinchout of the "D" seam and increases to 30 feet in the south edge of the mine area. At the northern part of the mine area, where the "D" seam is absent, the "E" seam lies 380 feet above

System	Stratigraphic Unit		Thickness (feet)	Description
TERTIARY	Green River Formation		-	Chiefly greenish lacustrine shale and siltstone.
	Wasatch Group	Colton Formation	300-1,500	Varicolored shale with sandstone and limestone lenses.
		Flagstaff Limestone	200-1,500	Dark yellow-gray to cream limestone, evenly bedded with minor amounts of sandstone, shale and volcanic ash, ledge former.
		North Horn Formation	500-2,500	Variegated shales with subordinate sandstone, conglomerate and fresh-water limestone, slope former.
CRETACEOUS	Mesaverde Group	Price River Formation	600-1,000	Gray to white gritty sandstone interbedded with subordinate shale and conglomerate, ledge and slope former.
		Castlegate Sandstone	150-500	White to gray, coarse-grained often conglomeratic sandstone, cliff former, weathers to shades of brown.
		Blackhawk Formation MAJOR COAL SEAMS	700-1,000	Yellow to gray, fine- to medium-grained sandstone, interbedded with subordinate gray and carbonaceous shale, several thick *coal* seams.
		Star Point Sandstone	90-1,000	Yellow-gray massive cliff-forming sandstone, often in several tongues separated by Masuk Shale.
	Mancos Shale	Masuk Shale	300-1,300	Yellow to blue-gray sandy shale, slope former.
		Emery Sandstone COAL	50-800	Yellow-gray friable sandstone tongue, cliff former. *Coal* present in subsurface.
		Blue Gate Member	1,500-2,400	Pale blue-gray, nodular and irregularly bedded marine mudstone and siltstone with several arenaceous beds, weathers into low rolling hills and badlands.
		Ferron Sandstone Member MAJOR COAL SEAMS	50-950	Alternating yellow-gray sandstone, sandy shale and gray shale with important *coal* beds of Emery coal field, resistant cliff former.
		Tununk Shale Member	400-650	Blue-gray to black sandy marine slope forming mudstone.
	Dakota Sandstone MINOR COAL		0-60	Variable assemblages of yellow-gray sandstone, conglomerate shale and *coal*. Beds lenticular and discontinuous.

Generalized section of rock formations, Wasatch Plateau coal field.
After Doelling, 1972.

Figure _ 1

the "A" bed, a thicker and more extensive underlying seam. The maximum overburden to be encountered in the Ute No. 1 Mine should not exceed 900 feet and only reaches 800 feet in one area.

In-place mineable coal reserves for the Ute #1 Mine in the "E"/"D" interval consisting of 4 feet or greater thickness are estimated to be 27,400,000 tons and 7,500,000 tons for the Ute #2 Mine. Criteria used for making the estimate were measured thicknesses of outcrops, drill holes in the mine area and by determining an area of influence between control points and projecting influence boundaries on an 1" = 500 feet, scale map and measuring the affected area (see Table 1).

The coal in the mine area can generally be ranked as high volatile C bituminous. The ash content is generally low (less than eight percent), but variable low coal heights and localized rock splits can increase this total percentage. The average sulfur content in the "E"/"D" zone as measured in the mine area is under two percent. Heat values in the No. 1 mine area range from about 11,000 Btu/lb. to 11,800 Btu/lb on an "as received" basis (see Table 2). Heat values for the Ute #2 mine ranged from 6,000 Btu/lb to 11,800 Btu/lb on an "as received" basis (see Table 3).

The planned optimum production for the Ute No. 1 Mine, to be reached in the sixth year of mining is expected to be 1,100,000 tons per year. This annual production will continue for the remaining mine life.

For the initial years of mining the emphasis will be on development of east and west submain entries to enable development of mining panels and allow for the introduction of more miner sections enabling maximum annual production to be achieved safely and in a reasonable amount of time. Room and pillar mining will begin immediately after the mains and the submains have been developed a sufficient distance to allow for panel development.

27B, #4

AVERAGE PROXIMATE ANALYSIS OF COAL FROM MOUNTAIN STATES RESOURCE CORPORATION EASE APPLICATION TRACT

Coal, Seam, Coal Condition, and Number of Analyses	Cleaning Plant Recovery (Percent)	Moisture (Percent	Volatile Matter (Percent)	Fixed Carbon (Percent)	Ash (Percent)	Sulfur (Percent)	Btu Per Pound
"A" Seam							
As received (3)	-	7.2	38.8	44.2	8.8	1.04	11,190
Dry (4)	-	-	42.1	48.5	9.4	1.23	12,080
Cleaned (4)	74.2	-	42.5	49.0	8.5	1.18	12,200
"D" Seam							
As received (5)	-	9.9	37.7	44.5	7.9	1.06	10,740
Dry (5)	-	-	41.9	49.5	8.6	1.11	11,950
Cleaned (5)	94.1	-	42.8	50.4	6.8	0.77	12,200
"E" Seam							
As received (3)	-	7.9	40.6	45.4	6.1	1.47	11,362
Dry (3)	-	-	44.0	49.3	6.7	1.60	12,330
Cleaned (2)	72.2	-	44.3	49.6	6.1	1.53	12,420

28B, #4

ESTIMATED COAL RESERVES MOUNTAIN STATES RESOURCES CORPORATION

Seam and Location	Area (acres)	Average Thickness (feet)	Total Coal in Place (1000 tons)	Total Recoverable Coal (1000 tons)
"A" Underground				
Entire Property	9,416	6.3	99,716	49,858
"D" Strippable				
South area	353	4.3	2,652	2,652
Central area				
Underground	781	7.4	10,175	10,175
South area	261	4.0	1,815	907
Central area	683	5.0	2,334	1,167
North area	137	5.0	1,192	596
"E" Strippable				
South area	245	4.0	1,708	1,708
Central area	544	6.8	6,460	6,460
North area	463	5.1	4,144	4,144
Underground				
South area	1,120	4.0	7,806	3,903
Central area	2,084	5.0	18,156	9,078
North araa	1,235	6.0	12,908	6,454

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TABLE 3
DRILLHOLE CORE ANALYSIS
UTE NO. 2 MINE AREA
WEIGHTED AVERAGE

Section	%Moisture	%Ash	%Sulfur	Btu As Received
26	13.19	29.96	6.60	7,030
26	16.15	17.23	1.06	8,588
23 & 26	18.43	17.02	1.01	7,995
13	14.88	8.93	2.65	10,166
13	15.46	17.84	0.64	8,518
24,23 & 13	14.80	16.78	1.42	8,800
24	14.56	16.41	1.72	8,907

As developed in the mine plan, five main entries will be driven into the proposed high wall to provide the necessary requirements for haulage, ventilation, escapeways and mine services such as power, water and drainage. All entries will be driven on the rock floor and mining height will be determined by variations in coal height.

Room and pillar mining sections would be developed perpendicular to the main and submain entries leaving safety barriers to protect these entries.

All mining is proposed to be done with continuous miners. A conveyor system will transport mined coal from inside the mine to the outside and deposit it in the proposed stockpile.

A belt conveyor system will be used to transport mined coal from all sections to the mains. From the main entries the conveyors will haul the coal outside the portal to a 12,500 ton open stockpile. It then will be loaded using front-end loaders into trucks for transportation to rail or markets or to a washing facility located a few miles away on privately owned property.

Main belts will be 48 inches wide with panel belts being 42 inces in width.

The annual coal production at the Ute No. 2 Mine would vary according to the depth of overburden being moved. The maximum production is projected in the second full operating year at about 1,600,000 tons.

With the objective of efficiently mining the coal in the Ute No. 2 Mine area, the operations will proceed on a five year mining plan. The first five years will include the construction of outside facilities, main haul roads, equipment assembly, and two types of stripping operations. It is anticipated that the first year of operation will consist of the building of outside facilities, power lines, main haul rooad and the on-site construction of the proposed 35 cubic yard dragline with the only actual stripping being done in dozer pits to a maximum depth of about 25 feet. The dragline stripping is scheduled to begin in the second year with dozer stripping continuing through part of the year. Dragline stripping will then continue through the third, fourth and fifth years with a new dozer pit being opened in the fifth year in the south area to enhance fifth year production. The overburden volumes to be moved and projected coal production for years one through five are itemized by coal seam and stripping method on Table 4. The well fragmented coal will then be loaded by a large (14-15 yard) rubber-tired front-end loader into 50 ton end-dump coal trucks (off-road type).

The loaded trucks will proceed out of the pit via the temporary one-way pit access/haul roads. These roads will enter the pit from the low pit end or through the spoil piles and will be kept at grades not to exceed 12 percent. All temporary roads will be kept, where possible, on the pit bottom or regraded spoil. The loaded trucks will haul the coal to either a stockpile/tipple or washing facility being considered on private land adjacent to the mine by way of pit access roads and the access/main haulage road.

The characteristics of this steam-grade coal make it excellent for both domestic and industrial markets. Even on a raw coal basis the new emission control equipment being installed on many new plants can adequately control the sulfur percentages inherent in this coal zone. For other markets a company coal washing facility is beind considered on private land a few miles from the No. 1 mine.

The corporation has submitted letters of interest from Portland Cement Company of Utah and Nevada Power Company indicating prospective purchase of coal from the No. 1 mine pending approval of the preference right lease and negotiation of a definite coal supply contract. These letters of interest indicate a reasonably assured market of 700 to 750 thousand tons per year. The required amount would probably increase to 1 million tons per year due to proposed plant expansion.

PROJECTED COAL PRODUCTION

Five Year Mine Plan
Central and South Stripping Areas

Year/Method	Overburden(1) Stripped (yds^3)	Seam/Coal In Mine (Tons)	Rib Loss(2) (Tons)	Total Coal Recovered (Tons)
1				
Dozers	2,023,200	"D" 468,592	23,429	445,163
2				
Dozers	1,226,772	"D" 373,724		
Dragline	12,776,057	"D" 1,306,773	86,553	1,644,520
		"E" 50,576		
3				
Dragline	11,874,764	"D" 1,460,983	73,049	1,387,934
4				
Dragline	11,318,345	"D" 761,011	57,792	1,098,065
		"E" 394,846		
5				
Dozers	760,860	"E" 269,711	46,467	883,481
Dragline	9,032,666	"D" 660,237		
Totals 5 Year	49,012,664	5,746,453	287,290	5,459,163

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(1) In calculating overburden removal volumes a 30% swell factor was considered

(2) Rib loss resulting from spoil onto exposed coal was calculated to be 5% from data at existing operations

Table IV

The near future market for the coal from the No. 1 mine is identified by Mountain States as Nevada Power Company which will need 600,000 to 650,000 tons of coal annually in their Reid Gardner generating station at Moapa, Nevada by mid-1976 and Portland Cement Company of Utah which will require about 100,000 tons per year at their Salt Lake City, Utah plant beginning in about three years when their present natural gas fuel supply is expected to have been phased out.

STATE: Utah **REGION:** Uinta **COUNTY:** Sevier

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Ute #1 and #2	Mountain States Resources Co. (Ute Energy Co.-Sublessee)	U 5135	5251.99	2,571.99	2,680.00	U/G S	INCOMPLT M.P.	2.7

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 134.9

RECOVERABLE:

SOURCE: Mine Plan

ASSOCIATED LEASES WITH REASONS WHY: Leases applied for: U5136, U5137, U5138, U5146

All Figures Shown in Million Tons

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah REGION: Uinta COUNTY: Sevier

MINE NAME (OR LEASE BLOCK): Ute #1 and #2

LESSEE(S) (OR OPERATOR): Mountain States Resource Co.

NUMBER OF LEASES IN BLOCK OR PLAN: 1

MINING METHOD: U/G, S

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	D	E						
FORMATION	Ferron	→						
RANK	hvC Bit	→						
THICKNESS	≥4'	≥4'						
Btu/LB	10,740	11,362						
SULFUR (%)	<2.0	→						
ASH (%)	<8.0	→						
MOISTURE (%)	9.9	7.9						
FIXED CARBON (%)	44.5	45.4						
VOLATILE (%)	37.7	40.6						
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL			134.9	MINE PLAN
	SURFACE			17.0	
	UNDERGROUND			116.0	
RECOVERABLE:	TOTAL				
	SURFACE			15.3	
	UNDERGROUND			58.0	

NOTES:

All Figures Shown In Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah REGION: Uinta COUNTY: Sevier

MINE NAME OR LEASE BLOCK: Ute #1 and #2

LESSEE(S): Mountain States Resource Co.

NUMBER OF LEASES: 1

DATE MINE OPENED: 1984
PROJECTED CLOSING DATE: 2006
REMAINING MINE LIFE: 22

REMAINING RECOVERABLE RESERVES:
FEDERAL:
NON-FEDERAL:

MINE DESIGN CAPACITY 2.7
RECOVERY RATE:

CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983			
1984	.1		
1985	.2		
1986	.4		
1987	.6		
1988	.8		
1989	.9		
1990	1.0		
Post 1990	56.0		

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

ALTON MINE
UTAH INTERNATIONAL, INCORPORATED (UII)
NEVADA ELECTRIC INVESTMENT COMPANY (NEI)
MAP LOCATION U- 15
FEDERAL COAL LEASES:

(NEI)	SL058575	(155.74 Acres)	U060746	(2,324.22 Acres)
	SL064507	(320.00 Acres)	U065012	(754.89 Acres)
	U0101153	(1,000.00 Acres)	U083072	(1,040.00 Acres)
	U060745	(2,492.89 Acres)	U098705	(2,286.74 Acres)
(UII)	U0105404	(1,529.42 Acres)	U0122651	(1,080.00 Acres)
	U0115938	(1,720.76 Acres)	U0122652	(80.21 Acres)
	U0122579	(1,119.81 Acres)	U0122675	(80.00 Acres)
	U0122582	(582.28 Acres)	U0124768	(200.00 Acres)
	U0122583	(320.00 Acres)	U0126916	(320.00 Acres)
	U0122584	(319.96 Acres)	U0140770	(518.60 Acres)
	U0122623	(280.00 Acres)	U0147999	(319.97 Acres)
	U0122647	(600.26 Acres)	U0149582	(560.00 Acres)
	U0122649	(840.00 Acres)	U098774	(2,487.60 Acres)
	U0122650	(1,600.00 Acres)	U098775	(1,599.36 Acres)

KANE COUNTY, UTAH

The Alton Coal Field is situated south and east of the town of Alton in western Kane County, Utah.

Plans for this development, the Allen-Warner Valley Power Project, propose the use of coal from the Alton field of southern Utah.

Nevada Electric Investment Company (NEI), a subsidiary of Nevada Power Company, and Utah International Inc. (UII), control essentially all surface mineable reserves in the Alton Coal Field.

Nevada Electric Investment leases are confined to the inverted horseshoe-shaped area forming the Alton West reserves. It has a total of

10,374.48 acres in eight Federal leases, and an additional 154.34 acres in owned fee land.

Utah International Inc. has 17,119.54 acres under twenty Federal and four State leases covering the Alton East reserve. UII also has 987.31 acres in the Alton West reserve from seven fee land leases. Additionally, UII has surface leases overlying leased and unleased Federal coal in the Alton West field.

In 1974, NEI and UII entered into an agreement under which UII would do field work and studies to investigate mining and the supply of coal from Alton to fuel the proposed Allen and Warner Valley power plants. The coal would be slurried and transported by pipeline to the plants.

The entire mine area is underlain by the coal-bearing Dakota Sandstone and Tropic Shale. Valley floors are underlain by Quaternary alluvium. Bald Knoll, a volcanic cinder cone, and basaltic flows of probable Quaternary age occur on the west edge of the Alton East mine area. Little is known about paleontologic resources at the mine site.

The coal field lies in a broad, gentle syncline plunging N. 30° E. and bounded on two sides by faults. The Sevier fault forms the west boundary of the field; the west side of the fault is downthrown 1,000 to 2,000 feet. The Paunsaugunt fault forms the east border of the field; it is downthrown to the west 100 to 500 feet. A third fault, the Bald Knoll fault, is downthrown 550 feet to the east and lies between Alton West and Alton East.

Coal in the Smirl coal zone is the only economic mineral known on the lease. Although the leasehold is covered with Federal oil and gas leases, no exploration holes have been drilled. The area southwest of Alton extending west into Dixie National Forest has an identified but unevaluated geothermal potential.

The surface mineable coal resources of the Alton field are divided into Alton West controlled by NEI and Alton East controlled by UII. These mine areas have been divided into blocks to be mined in a scheduled sequence, full production to be reached in the sixth year of mining.

Alton East contains about one-third (73,000,000 tons) and Alton West two-thirds (138,000,000 tons) of the reserves that lie under less than 150 feet of overburden. In addition, indicated reserves under 150 to 350 feet of overburden are estimated at 100,000,000 tons. The average heat value of the coal under less than 150 feet of cover is 9,647 Btu/lb, and the average sulfur content is 1.11 percent. The zone averages 12 feet thick over the whole field and 14 feet in the proposed strip-mining area. The Smirl zone is thickest in the west but thins and splits into several beds near the east border of the coal field.

Where overburden is less than 50 feet thick, it would be removed in 85-ton rear-end dump trucks and loaded by either electric shovels or diesel front-end loaders, each of which are equipped with 15-cubic-yard buckets. Where overburden is thicker, electric draglines in the 60-cubic-yard class would be used to strip material down to 100 feet. From that level to the maximum of 150 feet of overburden, front-end loaders and trucks would be used to remove material.

Overburden from as many as five initial cuts would be placed on land adjacent to the cut, some of which might have to be benched to hold material. These spoil piles would be shaped and reclaimed in-place rather than being returned to the pits. Overburden from additional cuts parallel to the first would be placed directly in the preceding cut. Also, all waste rock, preparation plant wastes and unsalvagable construction materials would be buried in mined-out pits.

Following overburden removal, the coal bed will be cleaned of any rock debris which will be pushed up against the spoil pile. The coal will then be drilled and the blastholes loaded with ammonium nitrate and fuel oil (ANFO). Blocks of 20-200 holes will be detonated at one time.

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The uncovered, broken coal will be loaded into bottom-dump coal haulers by 20-yard-class, front-end loaders working in the pit bottom. The trucks (120-ton class) will transport the coal along the pit bottom, out the ramp, then along the major road haul system to the preparation plant's raw coal receiving hopper.

UII has not yet developed a detailed reclamation plan. To meet applicable Federal standards, substantial revision is required to reclamation proposed by the company.

The goal of any proposed reclamation plan will be to return the land to a productive level at least equal to the premining situation on public lands and to assist private landowners in achieving desired land use. Generally, this would mean emphasizing domestic livestock and wildlife use. The details of the reclamation program will be prepared by the company in consultation with the surface managing agency as plans for mining each reserve block are prepared.

The Alton Coal Field contains sufficient coal to fully supply the Allen and Warner Valley power plants for their economic lives. Whether the shortfall which occurs in the proposed mining schedule after year 2003 will be made up by underground mining or by stripping to greater depths will be a decision based on economic, environmental, and geological factors which can best be assessed after a period of actual operating experience at the site.

The proposed method of operation is strip mining adapted to the varied topography and conditions. The stripping will uncover coal nearest the outcrop first, working in strips parallel to the outcrop trend. Successive strips will be taken through progressively deeper overburden until a depth of about 150 feet, or other limitations, preclude further stripping. Because of the irregular topography, individual mining blocks will vary in width and length from a few hundred to several thousand feet. Detailed plans have not been developed for mining individual blocks because of insufficient information on the nature of the coal bed(s). Cropline-drilling on all coal outcrops will precede mining by 1 to 3 years.

Because of thin overburden and proximity to the preparation plant, mining would begin on the Alton West, in 1982. Alton East would be opened in 1984. About 65 percent of production will come from the west property and 35 percent from the east property.

4B, #4

Coal Reserves and Analysis, Alton Coal Field
(Data Source: UII, Mining Plan)

Block[1]	Tons (in thousands)	BTU	Moisture (percent)	Ash (percent)	Volatiles (percent)	Fixed carbon (percent)	Sulfur (percent)
				Alton West			
1W-----	15,471	9,613	16.96	9.53	33.14	40.33	1.27
2W-----	17,918	9,095	17.70	14.10	33.10	36.68	1.76
3W-----	33,355	9,943	15.76	7.15	33.35	41.44	0.92
4W-----	12,007	9,913	16.26	8.26	33.43	41.68	1.10
5W-----	33,749	9,963	17.34	6.78	34.30	41.27	0.73
6W-----	15,259	9,724	15.74	10.38	32.78	40.72	1.31
7W-----	10,752	9,069	18.94	10.52	32.66	37.56	2.21
Total	138,511	9,707	17.04	8.94	33.42	40.30	1.18
				Alton East			
1E-----	12,322	9,385	18.28	9.84	32.04	39.14	1.11
2E-----	19,828	9,698	17.45	10.14	32.94	40.47	1.09
3E-----	18,581	9,318	18.11	10.85	32.88	38.02	1.20
4E-----	11,899	9,749	17.77	8.39	34.17	39.53	0.54
5E-----	10,860	9,530	16.79	10.83	32.74	38.73	0.73
Total	73,490	9,533	17.71	10.09	32.94	39.22	0.99
In-place reserves	212,001	9,647	17.27	9.34	33.25	39.93	1.11

[1] Mining blocks.

Reserves of the entire leasehold of 28,635 acres is not accurately known; in-place reserve of 212 million tons of 8,280 acres are proposed for strip mining at rate of 10.5 mty for 23 years, based on a mining depth no greater than 150 feet.

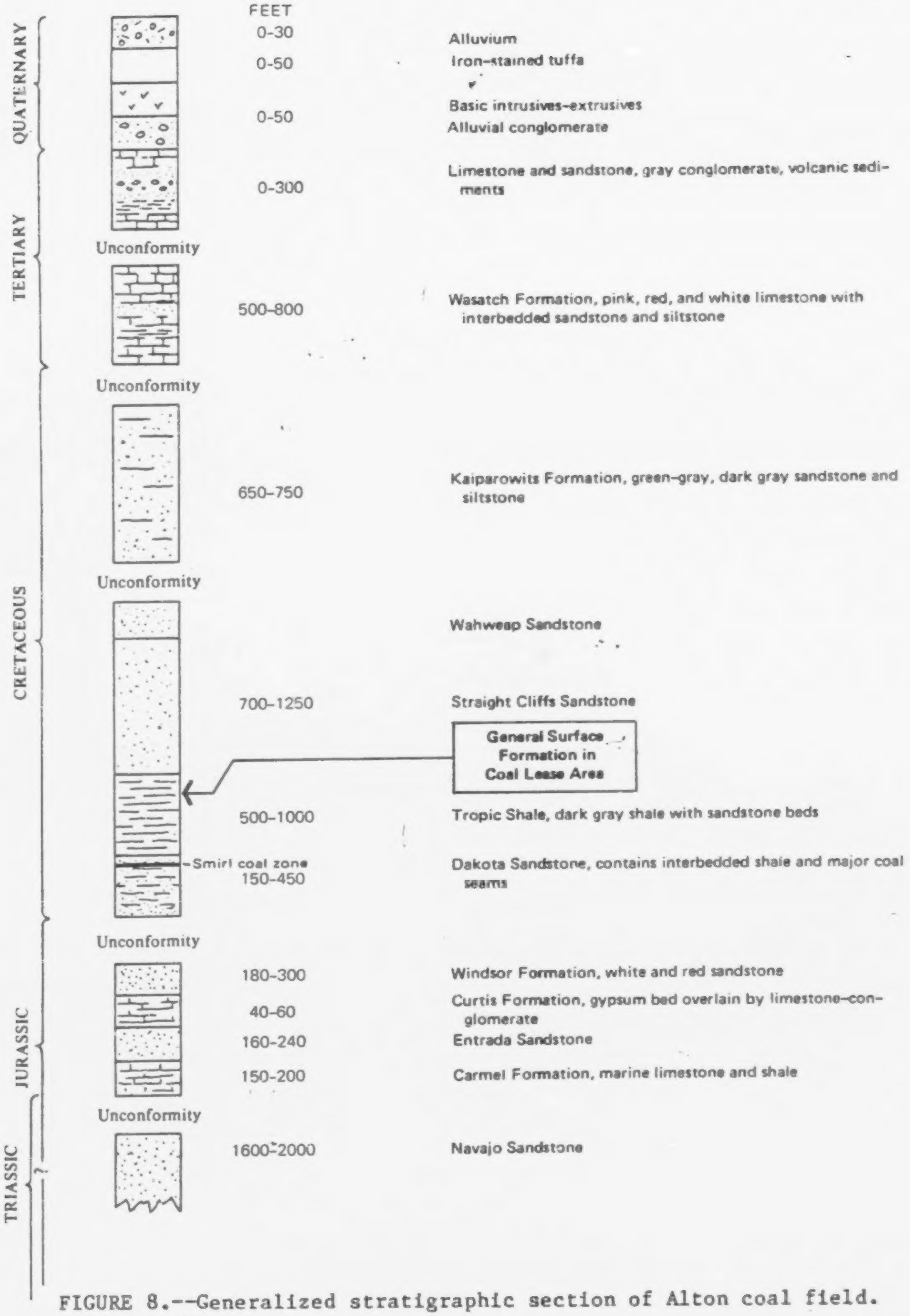
QUATERNARY
TERTIARY
CRETACEOUS
JURASSIC
TRIASSIC
FEET
0-30
Alluvium
0-50
Iron-stained tuffa
Basic intrusives-extrusives
0-50
Alluvial conglomerate
0-300
Limestone and sandstone, gray conglomerate, volcanic sediments
Unconformity
500-800
Wasatch Formation, pink, red, and white limestone with interbedded sandstone and siltstone
Unconformity
650-750
Kaiparowits Formation, green-gray, dark gray sandstone and siltstone
Unconformity
Wahweap Sandstone
700-1250
Straight Cliffs Sandstone
General Surface Formation in Coal Lease Area
500-1000
Tropic Shale, dark gray shale with sandstone beds
Smirl coal zone
150-450
Dakota Sandstone, contains interbedded shale and major coal seams
Unconformity
180-300
Windsor Formation, white and red sandstone
40-60
Curtis Formation, gypsum bed overlain by limestone-conglomerate
160-240
Entrada Sandstone
150-200
Carmel Formation, marine limestone and shale
Unconformity
1600-2000
Navajo Sandstone
?

FIGURE 8.--Generalized stratigraphic section of Alton coal field.

Proposed schedule of coal production from the Alton mine

[thousands of short tons]

Year	Raw coal mined		Total	Washed coal[1]
	Alton West	Alton East		
1982------	605	--	605	520
1983------	2,977	--	2,977	2,560
1984------	3,743	2,107	5,850	4,985
1985------	5,180	2,861	8,041	6,853
1986------	6,985	3,664	10,649	8,759
1987------	7,645	4,065	11,710	9,627
1988------	7,595	3,886	11,481	9,581
1989------	6,947	3,886	10,833	9,551
1990------	6,947	3,886	10,833	9,551
1991------	6,947	3,886	10,833	9,551
1992------	6,925	3,874	10,799	9,522
1993------	6,839	3,981	10,820	9,402
1994------	6,750	3,918	10,668	9,253
1995------	6,663	3,867	10,530	9,137
1996------	6,543	3,817	10,360	9,014
1997------	6,500	3,817	10,317	8,955
1998------	6,500	3,624	10,124	8,955
1999------	6,500	3,624	10,124	8,955
2000------	6,500	3,624	10,124	8,955
2001------	6,660	3,707	10,367	8,955
2002------	6,637	3,695	10,332	8,924
2003------	7,021	3,645	10,666	8,805
2004------	2,902	56	2,958	2,629
Totals--	138,511	73,490	[2]212,001	182,999

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[1] Includes production stored in stockpiles. Assumed analysis: 16.14 percent moisture, 7.8 percent ash, 10,088 Btu/lb.

[2] Based on 100 percent recovery; this would be 200 million tons at 94 percent (probable) recovery.

Source: Development of Coal Resource in Southern Utah Part 2 Site Specific Analysis.

Diligent Development Analysis

The coal reserves controlled by Utah International and Nevada Electric Investment Company constitute a massive amount of above average coal. The mine plan submitted by these two companies for the extraction of these reserves is based on sound mining engineering practices.

The two major impediments to the development of the 10 million-ton-per-year underground and surface mines envisioned by the proposers is the lack of adequate rail transportation into the region and the potential for environmental degradation. Considerable public pressure has been developing against the approval of this proposal and those for other mining developments in south-central Utah. Potential legal and political actions by the groups opposing these mines should keep the mines out of production until well after 1991.

STATE: Utah REGION: Uinta COUNTY: Kane

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Alton Mine	Utah International Inc. (UII) Nevada Electric Investment Co (NEI)	SLO 58575		155.74		S	Incomplt M.P	11.0
		SLO 64507		320.00				
		UO101153		1000.00	1132.65			
		UO60745		2,492.89				
		UO 60746	28,635.67	2,324.22				
		UO 65012		754.89				
		UO83072		1,040.00				
		UO98705		2,286.74				
		UO105404		1,529.42				
		UO115938		1,720.76				
		UO 122579		1,119.81				
		UO 122582		582.28				
		UO122583		320.00				
		UO122584		319.96				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 311

RECOVERABLE: 211

SOURCE: Mine Plan

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah **REGION:** Uinta **COUNTY:** Kane

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
		U0122623		280.00				
		U0122647		600.26				
		U0122649		840.00				
		U0122650		1,600.00				
		U0122651		1,080.00				
		U0122652		80.21				
		U0122675		80.00				
		U0124768		200.00				
		U0126916		320.00				
		U0140770		518.60				
		U0147999		319.97				
		U0149582		560.00				
		U098774		2,487.60				
		U098775		1,599.36				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE:

SOURCE:

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah REGION: Uinta COUNTY: Kane

MINE NAME (OR LEASE BLOCK): Alton Mine

LESSEE(S) (OR OPERATOR): UII & NEI

NUMBER OF LEASES IN BLOCK OR PLAN: 28

MINING METHOD: S

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Smirl							
FORMATION	Dakota							
RANK								
THICKNESS	12'-14'							
Btu/LB	9,647							
SULFUR (%)	1.11							
ASH (%)	2.34							
MOISTURE (%)	17.27							
FIXED CARBON (%)	32.93							
VOLATILE (%)	33.25							
SEAM DEPTH								
IN-PLACE RESERVES	212							
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE			311	Mine Plan
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			211	

NOTES:

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

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STATE: Utah **REGION:** Vinta **COUNTY:** Kane

MINE NAME OR LEASE BLOCK: Alton Mine
LESSEE(S): UII & NEI
NUMBER OF LEASES: 28
DATE MINE OPENED: ①
PROJECTED CLOSING DATE:
REMAINING MINE LIFE:

REMAINING RECOVERABLE RESERVES:
FEDERAL: } 211
NON-FEDERAL: }
MINE DESIGN CAPACITY 11.0
RECOVERY RATE: 68
CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990			
Post 1990			

NOTES:
① Proposed life - 1982 - 2004

All Figures Shown in Million Tons

PRODUCTION SUMMARY

KAIPAROWITS NOS. 1-5

MONO POWER COMPANY et. al.

MAP LOCATION U - 16

FEDERAL COAL LEASES:

U087805	(2,064.44 Acres)	U092141	(1,972.16 Acres)
U087806	(1,945.32 Acres)	U092142	(1,750.20 Acres)
U087807	(1,920.00 Acres)	U096486	(640.00 Acres)
U087828	(2,560.00 Acres)	U096494	(2,560.00 Acres)
U087833	(2,517.68 Acres)	U096495	(2,559.84 Acres)
U087834	(2,560.00 Acres)	U096496	(2,560.00 Acres)
U087835	(1,920.00 Acres)	U096497	(2,560.00 Acres)
U087836	(640.00 Acres)	U096509	(1,478.00 Acres)
U092138	(1,891.44 Acres)	U096508	(658.28 Acres)
U092139	(1,934.73 Acres)	U0101142	(1,562.08 Acres)
U092140	(2,022.48 Acres)		

KANE COUNTY, UTAH

The Kaiparowits coal project is owned and operated by these participating companies: Mono Power Company (a subsidiary of Southern California Edison Company), Resources Company (a subsidiary of Arizona Public Service Company), New Albion Resources Company (subsidiary of San Diego Gas and Electric Company), and Kaiser Industries Corporation performing under letter of intent, and will be referred to as the participants.

The proposed plantsite for Nos. 1-4 mines is 51 miles south of Escalante and 28 miles north of Glen Canyon City, Utah. Access is over unimproved secondary county roads, with steep grades and rough streambed crossings at washes. The No. 5 mine is near the southeast corner of the lease area, in Missing Canyon, a tributary to Warm Creek Canyon. The county road past the mine is classed as a jeep trail, although all types of road vehicles, including 15-ton trucks may use the road in dry weather.

The participants propose to haul the coal from the No. 5 mine to U.S. Highway 89 near Glen Canyon City, using the existing Smoky Mountain and Missing Canyon variant county road. This road is inadequate for coal haul traffic. However, the participants plan to provide cooperation and assistance to the Kane County Commission to help the county upgrade the road including the portion through the Glen Canyon National Recreation Area (NRA).

The Kaiparowits project consists of 40,277.35 acres of Federal coal leases and 7,490.44 acres of State leases making a grand total of 47,767.79 acres. The mine plan calls for coal to be produced from 4 coal seams from within 30,000 acres of the above total leased acreage.

Total area disturbed by the minesites, as presently planned, would be about 1,800 acres of which about 1,630 would be occupied over the life of the project.

The mine site areas are located in the south central part of the Kaiparowits plateau in the Smoky Mountain area. Most of the surface area is a bench into which Warm Creek and its tributaries---most notably Missing Canyon---have cut deep canyons from the southeast.

The structure of the Kaiparowits Plateau is essentially a basin with a system of asymmetrical anticline-syncline sets usually trending northwest and plunging into the central basin. These flexure sets are reflected in the surface by the action of erosion that has created strip plains on the more competent sandstones.

The major coal-bearing stratigraphic unit is the John Henry Member in which subbituminous B to high-volatile bituminous C rank occurs. In general, number and thickness of coalbeds increase from southwest to northeast across the lease area. The coal seams are generally less than 800 feet below the plateau surface.

The results of various drilling programs have been correlated, on the bais of this correlation, four principal coal seams have been delineated. These seams are designated in descending stratigraphic order as the Orange, Upper Red, Lower Red, and Brown.

The Orange, Upper Red, Lower Red, and Brown seams provide the best mining potential in terms of reserves and continuity. Other seams not now included in the mining plans are the Green and Lilac seams. Both of these seams are found in limited quantities in lenses at the eastern and northeastern sides of the leasehold.

Because the coalbeds are lenticular, estimates of reserves were based on isopach maps of individual seams.

In-Place and Recoverable Coal Reserves(1)
Within Mining Area

Seam	In-Place (tons)	Recoverable (tons)
Orange	88,410,000	44,200,000
Upper Red	314,150,000	157,100,000
Lower Red	358,480,000	179,200,000
Brown	307,960,000	154,000,000
TOTAL	1,069,000,000	534,500,000

(1) Environmental Impact Statement, Kaiparowits, USDOI

Coal quality data were available on a regional basis only in the EIS, the following analysis came from the ACLDS and is assumed to be an average analysis for the four seams:

Moisture	8.8%
Ash	9.2%
Sulfur	0.54%
Fixed Carbon	47.8%
Heat Content	11,300 Btu/lb

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Surface faulting has resulted from collapse at the edge of overly steep canyons. Faulting has also occurred where coal seams have burned and the overburden has collapsed. The extent and depth to which these faults affect the stratigraphy is small. Tectonic faults are only in evidence outside the main coal zone and lease area.

The original mine plan called for four separate mine portals for production of coal and a fifth mine portal for training purposes. This plan was modified to eliminate the training mine and have all five mines producing coal; 11,000,000 tons per year are to come from mine Nos. 1-4 and 1,000,000 tons per year are to come from mine No. 5.

The coal production schedule indicates that full production of the mine will not be attained until year 9 of the operation. The total mine life is expected to be 35 years.

	ESTIMATED ANNUAL
Year	Production (tons)
1	100,000
2	700,000
3	1,800,000
4	3,400,000
5	5,600,000
6	8,000,000
7	10,000,000
8	11,200,000
9	12,000,000
10-35	12,000,000
TOTAL	364,800,000

Because of multiple-bed occurrence of coal, operation of the five mines must be sequenced to minimize effects of mining a particular bed on other beds in the coal section.

Work would commence with upper beds and progress systematically downward in each mine area. Mine No. 2 in the north and Mine No. 3 and 5 in the south would be developed initially to preclude interference with development of Mine No. 1 and Mine No. 4 in lower coal beds.

Each of the five production mines would be of similar design, the only difference being the number of coal beds to be mined and location and orientation of access slopes, ventilation shafts, and surface facilities. Some mines would produce from four or more coal beds, while others would operate only in three mineable beds.

Each mine would be developed by driving a 15 to 20 percent "rock slope" (declining shaft) from surface facilities downward through the strata to the coal beds. The rock slope would be of sufficient size to serve two purposes: coal transport from the mine to the surface, and delivery of men, equipment and supplies to the active mining area.

The participants have stated that, where possible, maximum extraction mining methods such as "longwall," "shortwall" or "room-and-pillar" with pillar extraction would be practiced. Initial deveopment of the mines would make use of continuous mining equipment, utilizing the room and pillar system.

Coal beds up to 30 feet in thickness occur in scattered parts of the area designated for mining. Widely tested and utilized coal mining techniques and equipment size restrict recovery height in thick coal beds over any appreciable area to about 14 feet. Historically, over small local areas, near complete recovery of beds in the neighborhood of 25 to 30 feet has been attained in other regions utilizing combinations of coal mining equipment and techniques. Coal beds less than about 4 feet in thickness would not be mined.

In general, four specific mining methods have been proposed by the participants for immediate or ultimate use in Kaiparowits coal mines. They are: (1) conventional room and pillar, (2) contintuous room and

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pillar, (3) longwall, and (4) shortwall. In each mine, one of the above methods or a combination of methods would be used dependent upon varying conditions encountered in the mines.

Explanation of the conventional and the continuous room and pillar techniques are text book derived and not included in this narative. The longwall explanation is similar, except they quote a panel size of 300 to 600 feet wide and between 2,500 to 7,500 feet long. Shortwall mining techniques are derived from Palowitch and Briskey, 1973 and a panel size of 180 feet wide and 3,000 feet long is suggested.

Raw or "mine-run" coal up to 12 inches in size would be delivered to the surface by a belt conveyor from each mine to a 1,500 ton-per-hour rotary breaker near the po'tal. The rotary breaker would reduce the size of the coal to less than four inches, providing a product more easily handled by conveyor belts.

From the rotary breaker, coal would be transported by an enclosed belt conveyor to a nearby 5,000-ton capacity raw coal storage silo serving as a "surge pile" or buffer supply against periods of low mine output. From the silo, another short enclosed belt conveyor would deliver the coal to a wider belt conveyor for shipment to four 30,000-ton capacity storage facilities at the coal preparation plant (washery).

It is anticipated that output from these mines will be used to fuel an electric power plant. The growth in demand for electric power has been continuous over the past 30 years. Because electric power can be utilized to meet a large number of energy needs, it is a preferred energy source in new applications and is assured of future growth of demand.

SOURCE: Development of Coal Resources in Southern Utah, Final Environmental Statement, 1979.

Kaiparowits, Final Environmental Impact Statement, 1976.

Kaiparowits, Mining and Reclamation Plan, July, 1975.

Diligent Development Analysis

The coal reserves controlled by Mono Power et al. constitute a massive quantity of above average coal. The mine plan the company has submitted for the extraction of these reserves is based on sound mining engineering practices.

The two major impediments to the development of the 12 million-ton-per-year underground mine envisioned by the proposers is the lack of adequate rail transportation into the region and the potential for environmental degradation. Considerable public pressure has been developing against the approval of this proposal and those for other mining developments in south-central Utah. Potential legal and political actions by the groups opposing these mines should keep the mines out of production until well after 1991.

STATE: Utah **REGION:** UINTA **COUNTY:** Kane

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Kaiparowits Nos. 1-5	Mono Power Co., Resources Co., New Albion Resources Co., Kaiser Industries Corp.	U087805	47,767.79	2064.44	7,490.44	U/G	INCOMPLT M.P.	12.0 TPY
		U087806		1945.32				
		U087807		1920.00				
		U087828		2,560.00				
		U087833		2517.68				
		U087834		2560.00				
		U087835		1920.00				
		U087836		640.00				
		U092138		1891.44				
		U092139		1934.73				
		U092140		2022.48				
		U092141		1972.16				
		U092142		1750.20				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE: 1069.0

RECOVERABLE: 334.8

SOURCE: EIS

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: UTAH **REGION:** UINTA **COUNTY:** KANE

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL (PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
		U0 96486		640.00				
KAIPAROWITS		U0 96494		2560.00				
		U0 96495		2559.84				
		U0 96496		2560.00				
		U0 96497		2560.00				
		U0 96509		1478.00				
		U0 96508		658.28				
		U0 101142		1562.08				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

SOURCE:

RECOVERABLE:

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah REGION: UINTA COUNTY: Kane

MINE NAME (OR LEASE BLOCK):	LESSEE(S) (OR OPERATOR):	NUMBER OF LEASES IN BLOCK OR PLAN:	MINING METHOD:
Kaiparowits Nos. 1-5	Mono Power et al	21	U/G

COAL CHARACTERISTICS:	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	Orange	Upper Red	Lower Red	Brown				
FORMATION								
RANK								
THICKNESS								
Btu/LB	11,300	→	→	→				
SULFUR (%)	0.54	→	→	→				
ASH (%)	9.2	→	→	→				
MOISTURE (%)	8.8	→	→	→				
FIXED CARBON (%)	47.8	→	→	→				
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES	88.41	314.15	358.48	307.96				
RECOVERABLE RESERVES	44.20	157.10	179.20	154.00				
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL			1069.0	EIS
	SURFACE				
	UNDERGROUND			1069.0	EIS
RECOVERABLE:	TOTAL			364.8	EIS
	SURFACE				
	UNDERGROUND			364.8	EIS

NOTES:

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah **REGION:** UINTA **COUNTY:** Kane

MINE NAME OR LEASE BLOCK	LESSEE(S)	NUMBER OF LEASES	
Kaiparowits Nos. 1-5	Mono Power et al	21	DATE MINE OPENED: ? PROJECTED CLOSING DATE: REMAINING MINE LIFE: 35

REMAINING RECOVERABLE RESERVES:
FEDERAL:
NON-FEDERAL:

MINE DESIGN CAPACITY 12.0
RECOVERY RATE: 33

CUMULATIVE PRODUCTION TO 1979:
1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990			
Post 1990			

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

12B, #4

RED AND BLUE MINE
EL PASO ENERGY RESOURCES COMPANY

MAP LOCATION U-17

FEDERAL COAL LEASES:

U0115971	(2,560.00 Acres)	U0140836	(2,557.28 Acres)
U0115972	(1,280.00 Acres)	U0140837	(2,553.40 Acres)
U0115793	(1,280.00 Acres)	U0148535	(1,920.00 Acres)
U0115833	(640.00 Acres)	U0130985	(2,560.00 Acres)
U0130986	(2,561.00 Acres)	U083000	(1,440.00 Acres)
U0130988	(1,907.24 Acres)	U083005	(640.00 Acres)
U0130989	(2,560.00 Acres)	U24427	(1,280.00 Acres)
U0136512	(1,279.28 Acres)	U27835	(639.92 Acres)

STATE COAL LEASES: 12,887.16 Acres

KANE COUNTY, UTAH

The El Paso Energy Resources Company is a wholly-owned subsidiary of The El Paso Company. The El Paso lease holdings are on the Kaiparowits Plateau about 30 miles north of Page, Arizona, and about 28 miles south of Escalante, Utah.

The El Paso Coal Co. has submitted plans for approval to mine 6,800,000 tons of coal per year from two underground mines. The proposed Blue mine would produce 500,000 tons per year and the proposed Red mine would produce 6,300,000 tons per year from a leasehold consisting of 27,659 acres of Federal land and 12,887 acres of State land. The company anticipates placing the Blue mine into production first; implementing the Red mine proposal would require both major road upgrading and a new transportation system.

The 40,546 acre lease holding has been divided into four reserve areas. The company proposes to mine reserve area A through the Red mine and reserve area C through the Blue mine. Plans for reserve areas B and D are not submitted.

The John Henry Member of the Straight Cliffs Formation contains the major coal resources of the Kaiparowits Plateau. Of Upper Cretaceous age, the John Henry was deposited in marine and non-marine environments on the southwest side of the Late Cretaceous western interior seaway.

Nine coal seams have been identified in the lease area by exploration drilling. Of these nine seams, only six will be mined from the Red mine and two from the Blue mine. The Red mine would produce 200,000,000 tons over a projected 38-year mine life and the Blue mine 6,000,000 tons over a 12-year projected mine life. Coal recovery would be 50 percent of estimated in-place reserves. Excess coal thickness and minimum seam separation preclude greater recovery under present technology.

Structural geology in the Red mine area is fairly simple. In general, the beds strike N. 35 W. and dip 3° to the southwest. No evidence of faulting has been noted in the area. Fold axes suggest that the primary (face) cleat direction is approximately N. 55°E. and the secondary (butt) cleat direction is N. 35°E.

Outcrops of three major coal seams (H, J, K_2) are exposed in the canyon walls of Dry Canyon within the Blue mine area. The K_2 seam crops out in the bed of Dry Canyon and is 13.2 feet thick. The J seam crops out approximately 110 feet above the K_2 seam in sec. 9 and varies between 3 and 4 feet thick. The H seam exposed in the Blue mine area occurs approximately 180 feet above the K_2 seam and averages 7.0 feet thick.

Kaiparowits Plateau coal ranges from subbituminous C to high-volatile A bituminous, but is generally high-volatile C bituminous. The coal quality of the Red mine area also indicates high-volatile C bituminous. The coal has no coking properties and may require some cleaning to insure a satisfactory product for power generation.

PROXIMATE ANALYSIS (as required)

	Reserve Area A	Reserve Area C
Moisture %	6.37-8.31	7.04-9.25
Ash %	6.22-13.31	4.34-12.71

	Reserve Area A	Reserve Area C
Volatile %	37.77-40.51	37.53-40.72
Fixed Carbon %	42.52-46.78	41.09-47.45
Sulfur %	0.42-0.83	0.38-1.23
Btu/lb	11,115-11,973	10,735-12,023
Thickness - feet	6.5-22.8	4.4-11.9

Subsidence may occur after a seam is mined, in areas where it is of concern, the pillars will be left in-place to prevent its occurrence. These areas include surface facility areas and the bench rims and steep walled canyon areas.

The Red mine plant site and mine shafts are located in the Last Chance Creek draingage. The plant site would be on State owned and Federally owned BLM administered land in a widened area in the generally narrow canyon. The plant facilities would be located in the flat area on either side of and including the drainage. A channel diversion and new channel would be installed to carry water flow.

Entry to the Red mine would be from two areas on Federal land designated as unit No. 1 and No. 2. Each unit would have two 24-foot diameter vertical shafts. Each shaft would have two compartments for service, production, and ventilation. The ultimate depth of unit No. 2 would be 943 feet. The mining method would be room and pillar with continuous miners; however, if conditions indicate that either longwall or shortwall mining would be adaptable or more economical, either or both methods would be used. Underground mining facilities would include a maintenance shop, warehouse, and a bulk "rock dust" (limestone) storage facility. The "rock dust" would be transported by pipes from surface tanks.

Coal from the Red mine would initially be extracted from the H, J, and K_2 seams. When the reserves from these three seams are exhausted, coal would be removed from the lower seams.

The company indicated manpower requirements during the construction phase would range from 150 to 450 and during the mining phase from 168 to 1,176. However, based on a production rate of 15 tons of coal per manshift, 230 manshifts per year, and an annual production of 6,300,000 tons per year the task force assumes that the probable mining personnel requirement for the Red mine would be 1,825.

Entry to the Blue mine would be in the outcrop by five parallel openings, each 20 feet wide, on 100-foot centers. Development in reserve area C would start at the outcrop of the H seam. Crosscuts would connect the entries, and they would be spaced on 80-foot centers. A 200-foot barrier pillar, would be left on both sides of the main entries to provide stability and to protect the main entry system from caving. A 300-foot-wide wide pillar would be left in-place along the outcrop for bench rim and canyon wall protection.

Coal would be extracted from the H seam for the first 5 years, then from the J seam for the next 5 years.

The company indicates that personnel requirements at the Blue mine would be 40 for construction and from 41 to 85 for mining. However, based on an estimated average production of 15 tons of coal per manshift and on an annual production of 500,000 tons per year, the task force assumes that 145 mining and support personnel would be required for the Blue mine.

The coal would be truck hauled from the Blue mine to a proposed transfer facility at Glen Canyon City, a total distance of 30-miles. The proposed primary routes would require six miles of new road construction from the proposed minesite along part of Dry Wash and then west to a Kane County low-grade secondary road (Smoky Mountain road). The primary route would then utilize the Warm Springs (Missing Canyon) variant of the Smoky Mountain county road and cross the Glen Canyon National Recreation Area to Glen Canyon City. The primary routes would require extensive upgrading or reconstruction of about 24 miles of existing roads.

Road access to the Red mine would probably use the same route as the Blue mine although the alternate road is proposed in the mine plan. The proposed production from this mine of 6.3 mty would require a major transportation system to move the coal to potential market areas. The company is studying various transportation proposals.

Three rail systems are being considered in conjunction with El Paso, with coal being moved from the mine to the rail terminus by conveyor.

Three slurry pipeline systems have also been proposed: (1) to a railhead at Cedar City, (2) to a railhead at Flagstaff and (3) to Walsenburg, Colo. The Company anticipates obtaining water for any slurry line (3,680 acre-feet annually) from Lake Powell.

MARKETS FOR COAL PRODUCTION

BLUE MINE

Until major transportation systems are established for the Red mine, coal transportation for the small Blue mine will be by truck. It is anticipated that run-of-mine coal from this mine will be trucked to rail facilities near Flagstaff, Arizona. This coal will then be available to serve partial requirements of utilities and total requirements of industrial customers who, due to the natural gas shortage, have made plans to convert to coal in the early 1980's. This coal will also be available to serve domestic needs within its market area.

RED MINE

Within the past year, El Paso has directly discussed supplying coal from the Red mine area with representatives of at least nine utilities in the south and southeastern portions of the United States as well as several utilities in the southwest and lower Pacific coastal regions.

In-place coal reserves, El Paso Coal Co., Kane County, Utah

[In-place tonnage given in millions of tons (MMT)]

Reserve area and mine name	Reserve classification		Coal seams									Total in-place tons
			H^1	I	J^1	K_1	$K_2{}^2$	L	M^2	N^2	O^2	
A, Red mine--	Proven----------	Average thickness (ft)---	6.5	6.4	9.5	7.3	11.4	---	22.7	16.4	9.4	
		Area (acres)-------------	2,906	1,536	3,578	2,522	4,358	---	4,524	4,499	4,045	
		In-place tons (MMT)------	34	18	61	33	89	---	185	133	69	622
B, No plan---	Indicated------	Average thickness (ft)---	7.5	14.1	11.8	9.4	7.5	10.3	10.2	6.0	8.3	
		Area (acres)-------------	3,968	3,008	2,752	2,560	2,752	2,944	4,672	2,112	2,560	
		In-place tons (MMT)------	53	76	59	43	37	55	85	23	38	469
D, No plan---	Inferred, indicated and proven.------	21,971 acres-------------	Calculations incomplete but total in-place reserves of coal beds 4 feet thick or greater are estimated to be 1,600 MMT.									1,600
C, Blue mine-	Indicated------	Average thickness (ft)---	7.3	---	11.0	---	7.7	6.2	10.2	10.8	6.3	
		Area (acres)-------------	480	---	320	---	1,200	1,280	1,280	1,280	1,280	
		In-place tons (MMT)------	6	---	6	---	17	14	24	25	15	107
Scattered---- sections, no plan.	Inferred------------------------------------		8,000 acres; information very limited but in-place reserves of coal beds 4 feet thick or greater are estimated to be 250 MMT.									250

[1] Coal beds to be mined from both the Red and the Blue mines.

[2] Coal beds to be mined from the Red mine only.

Source: Development of Coal Resources in Southern Utah, Part 2, Site Specific Analysis, Final ES, 1979.

TABLE 1.--Summary of mining plan and preliminary proposals

	Red mine (Reserve area A)	Blue mine (Reserve area C)
Proposed mine (approximate acres):		
Federal	3,320	240
State	1,280	240
Total	4,600	480
Product	Washed coal.	Raw coal.
Market	Unspecified utility companies.	Unspecified utility companies.
Estimated coal reserves (millions of tons):		
In place (mining plan)	622	12
Recoverable	200	6
Expected mine life (years)	38	12
Production rate (mty)	6.3	.5
Development schedule (months):		
Initiation to production	24	6
Initiation to full production	96	24
Ancillary requirements (off lease):[1]		
Access roads (company) (miles)	0	6
Access roads (State or county) (miles)	30	30
Powerlines (miles)	25-35	25-35
Water wells (each)	7	1 or more
Railroad	(2)	0
Slurry line	(2)	0
Land surface disturbance (acres):		
Portal facilities	32	33
Washery and plantsite	838	0
Ancillary requirements (off-lease)[2]	Unknown	55
Major resource requirements:		
Water (acre-ft/year)[3] (mining)		
Mining	970	30
Community supply	2,330	170
Lime (rockdust) (tons/year)	30,000	2,500
Personnel requirements:		
Construction	450	40
Mine operation[4]	1,825	145

[1] Preliminary plans that will require future environmental assessment and not subject to approval as a part of this Federal action; known ancillary facilities will serve both the Blue and Red mines.

[2] El Paso Coal Co. plans to ship this coal via 1 of 3 proposed railroads, D&RGW to Marysvale, Sante Fe to Flagstaff, Ariz., or Union Pacific to Cedar City, Utah, and (or) 1 of 3 slurry lines proposed to Cedar City, Flagstaff or Walsenburg, Colo.

[3] Amounts given are task force estimates; company mine plan shows 960 acre-ft/year for Red mine and 10 acre-ft/year for the Blue mine, but no estimate was made for additional community supply.

[4] 15 tons/manshift, 230 manshifts/year (includes support).

PLANNED PRODUCTION SCHEDULES

(Thousands of Tons, Run-of-Mine Basis)

Project Yr.*	Blue Mine Tons per Year	Red Mine Tons per Year
1	30	-
2	425	-
3	500	40
4	500	500
5	500	1580
6	500	3050
7	500	4000
8	500	5000
9	500	6250
10	500	6250
11-38	-	6250
Total tons	4,455	201,670

* Project years for each mine commence with field construction and underground development.

STATE: Utah **REGION:** UINTA **COUNTY:** Kane

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
Red and Blue Mine	El Paso Energy Resources Co.	U0115791	40,545.80	2560.00	12,887.16	U/G	INCOMPLT M. P.	6.8 ①
		U0115792		1280.00				
		U0115793		1280.00				
		U0 115833		640.00				
		U0 130986		2561.52				
		U0 130988		1907.24				
		U0 130989		2560.00				
		U0 136512		1279.28				
		U0 140836		2557.28				
		U0 140837		2553.40				
		U0 148535		1920.00				
		U0 130985		2560.00				
		U0 83000		1440.00				

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE: 206.0

SOURCE:

Mine Plan

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

① Blue mine - 0.500 TPY
Red mine - 6.300 TPY

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah **REGION:** UINTA **COUNTY:** Kane

MINE NAME (OR LEASE BLOCK	LESSEE(S)	LEASE NOS.	TOTAL(PLAN) ACRES	FEDERAL ACRES	NON-FEDERAL ACRES	MINING METHOD	STATUS	PEAK CAPACITY
		U 24427		1280.00				
		U 27855		639.92				
		U083005		640.00				
		State Leases						

MINE PLAN OR LEASE BLOCK RESERVES:

IN-PLACE:

RECOVERABLE:

SOURCE:

All Figures Shown in Million Tons

ASSOCIATED LEASES WITH REASONS WHY:

COMMENTS:

MINE PLAN OR LEASE BLOCK SUMMARY SHEET

STATE: Utah REGION: UINTA COUNTY: Kane

MINE NAME (OR LEASE BLOCK): Red and Blue Mine

LESSEE(S) (OR OPERATOR): El Paso Energy Resources Co.

NUMBER OF LEASES IN BLOCK OR PLAN: 16

MINING METHOD: U/G

COAL CHARACTERISTICS: ①	SEAM 1	SEAM 2	SEAM 3	SEAM 4	SEAM 5	SEAM 6	SEAM 7	SEAM 8
SEAM NAME	H	J	K_2					
FORMATION								
RANK	hV C Bit	→	→					
THICKNESS	7'	3'-4'	13.2'					
Btu/LB								
SULFUR (%)								
ASH (%)								
MOISTURE (%)								
FIXED CARBON (%)								
VOLATILE (%)								
SEAM DEPTH								
IN-PLACE RESERVES								
RECOVERABLE RESERVES								
RECOVERY RATE								

MINE PLAN OR LEASE BLOCK RESERVES		FEDERAL	NON-FEDERAL	TOTAL	SOURCE
IN-PLACE:	TOTAL				
	SURFACE				
	UNDERGROUND				
RECOVERABLE:	TOTAL				
	SURFACE				
	UNDERGROUND			206 ②	

NOTES: ① Coal analysis done by reserve area, not by seam. See writeup.

② 6.0 - Blue Mine, 200.0 - Red Mine

All Figures Shown in Million Tons

COAL RESERVES CHARACTERISTICS

STATE: Utah **REGION:** UINTA **COUNTY:** Kane

MINE NAME OR LEASE BLOCK: Red and Blue Mine

LESSEE(S): El Paso Energy Resources Co.

NUMBER OF LEASES: 16

DATE MINE OPENED: ?

PROJECTED CLOSING DATE:

REMAINING MINE LIFE: 38

REMAINING RECOVERABLE RESERVES:

FEDERAL:

NON-FEDERAL:

MINE DESIGN CAPACITY 6.8

RECOVERY RATE: 50

CUMULATIVE PRODUCTION TO 1979:

1979 ACTUAL PRODUCTION:

MINE PLAN PROJECTED PRODUCTION BY YEAR:	TOTAL ANNUAL PRODUCTION	TOTAL ANNUAL FEDERAL PRODUCTION	COMMITTED/CONTRACTED PRODUCTION
1980			
1981			
1982			
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990			
Post 1990			

NOTES:

All Figures Shown in Million Tons

PRODUCTION SUMMARY

#2

633

CARBON COUNTY TRACT

EUREKA ENERGY CORPORATION

MAP LOCATION U-2

FEDERAL COAL LEASES: U05067

CARBON COUNTY, UTAH

The Carbon County Tract held by Eureka Energy Corporation includes one Federal lease with a total acreage of 320 acres. It is located north of Price, Utah near the proposed Deadman Canyon mine of AMCA Coal Leasing Corporation.

The reported reserves for the property are 1.2 million tons using underground mining. There is no specific information available on the coal quality characteristics, however, the coal is said to be of marketable quality.

There have been indications of potential mining problems in the area of the tract. These include the presence of faulting which could have a very significant effect on a property of this size.

Diligent Development Analysis

The quantity of recoverable reserves that is available, together with the unsubstantiated report of potentially adverse mining conditions, make it highly unlikely that Eureka Energy will proceed to develop its property. The company would have many easier ways of obtaining this quantity of coal without entering into the difficulties of obtaining operating permits for what would be at best a marginally economic operation. Unless additional contiguous reserves are obtained, it is doubtful that the property will be in production by either 1986 or 1991.

SUNNYSIDE NORTH TRACT

KAISER STEEL CORPORATION

MAP LOCATION U-7

FEDERAL COAL LEASES: U02785
U039706

CARBON COUNTY, UTAH

The Sunnyside North Tract held by Kaiser Steel Corporation consists of two federal leases with a combined acreage of 4919.16 acres. The tract is located 13 miles northwest of the existing Kaiser Sunnyside operation and 14 miles to the northwest of Sunnyside, Utah.

Available information indicates that coal can be recovered from three seams, the Upper and Lower Sunnyside and the deeper lying Gilson seam. Seam thicknesses range from a minimum of five feet to a maximum of 14 feet. The regional dip of the seams that would be mined varies from five to 15 degrees, but is generally less than 10 degrees. Estimated recoverable reserves are 51 million tons with a BTU content of 12,000 to 13,000 and a sulfur content of one to two percent. The sulfur content is somewhat higher than the coal in the Sunnyside mine.

The projected method of recovery is either longwall or room and pillar using continuous miners for coal extraction. The question as to which of these methods is most suitable can only be resolved when more information is available. Faulting has not been a problem in the area.

Diligent Development Analysis

Kaiser has an estimated remaining mine life of 10 years for its existing mine complex at Sunnyside. Indications are that Kaiser is satisfied with the current one million-ton-per-year production rate because that rate is sufficient to supply its coke requirements at its Fontana steel works in southern California. Therefore, it is believed that Kaiser is not anxious to bring the Sunnyside North Tract into production in the near future. According to the company, they would like to bring this tract into an LMU with the Sunnyside mine to comply with diligence, however, the tracts are not contiguous and this would not be possible under current law. Kaiser is seeking a connecting lease that would form an LMU.

It is highly unlikely that the property will be developed and ready to produce by 1986. Judging from current activity and production plans development by 1991 is also questionable.

I-70 TRACT

CONSOLIDATION COAL COMPANY

KEMMERER COAL COMPANY

FEDERAL COAL LEASES:
U073039 (2576.86)
U0101213 (2161.57)
U0101214 (2314.25)
U0101215 (856.40)
U0101217 (640.00)
U0101218 (1880.00)
U090231 (2496.62)
U073040 (2542.25)
U073041 (2557.99)

SEVIER & EMERY COUNTIES, UTAH

The federal lease block, consisting of 18,025.94 acres, lies south of the lessee's Emery Deep Mine, is bordered on the east by State Highway 10 and is divided by Interstate 70. The Emery Deep Mine, which is an operating underground mine, is located approximately three miles south of the town of Emery, Utah at the southern end of Castle Valley in Emery County. The southeast portion of the block also partially surrounds the Dog Valley Mine. Dog Valley is a low tonnage underground operation wholly on private land covering no more than 640 acres.

Castle Valley is a wide belt of relatively flat land between the Wasatch Plateau and the San Rafael Swell to the east. However, the valley narrows considerably near the town of Emery because of the western marginal influence of the swell. It is believed that the valley owes its existence to the softness of the thick Mancos Shale Formation which underlies it. The Ferron sandstone is the only resistant member and forms a low ridge in the valley with a westward sloping surface.

Coal in the Ferron sandstone member is located in the lower third portion of its upper unit. There are 13 coal beds present, four of which are regarded as the principal coal beds--the I, J, C-D, and A. Exploration data indicates that the beds are not continuous throughout the lease block. The J (2 to 5 ft.), C-D (2 to 5 ft.) and A (2 to 13 ft.) beds appear to exist predominately along the eastern portion of the block. The C-D bed extends farther south and west of beds J and A. The I (2 to 20 ft.) bed appear to cover the north half of the block as well as the eastern portion of the southern half. The coal beds in the block are characterized by their lenticularity. Examinations of outcrops indicate only minor oxidation (burn), and there is little evidence of major faulting.

Preliminary coal analyses indicate that the A and I coal beds are of comparable quality and heating value. The analysis of the beds follow:

Moisture %	3.7
Ash %	11.6
Volatile Matter %	39.0
Fixed Carbon %	49.0
Sulfur	0.95
Heating Value Btu/lb.	11,500
Dip (degrees)	3
Thickness	2 to 7 feet (total thickness of all seams--20' or less)

The reserves are indicated as follows: 43 million tons surface in-place; 30 million ton surface recoverable (2 feet minimum thickness and 150 feet maximum overburden) and 100 million ton underground recoverable (4 feet minimum thickness and 50 percent recovery).

A mine plan is currently not on file with the USGS or OSM, but preliminary analysis of the geologic and topographic data provides a reasonable indication of the blocks mining potential. The surface mineable coal appears to be primarily located along the northern and eastern portions of the block and the underground mineable coal appears to be located throughout the block. The design of a mine is complicated by the dissection of the block by I-70 and the lenticular nature of the coal. Due to these circumstances the surface and underground mining operations will not be continuous throughout the block.

The surface mining may be performed by a truck-shovel/front end loader combination or dragline or combination thereof. The surface operation will probably mine all coal in excess of two feet thick with overburden less than 150. Fugitive dust control and reclamation could be a problem due to the rocky and clayey topsoil and low annual precipitation.

Due to the lenticularity of the coal, the underground operation will probably be room and pillar utilizing continuous mining equipment. The underground mining height will probably range from 4 to 12 feet. Subsidence is not expected to be a problem due to the highly competent nature of the Bluegate Shale and Ferron sandstone overburden. Roof control may be a problem due to the highly jointed nature of the immediate roof rock. Adequate roof support utilizing roof bolts should remedy any encountered roof support problems.

A firm market has not been identified for the coal, but possible sources, accoring to the OTA Utah Task Force, could include Mountain Fuels proposed synfuels plant and/or IPP's proposed electric generation plant. Transportation of the coal to these two sources would be by truck. The IPP plant, as planned, will be approximately 50 miles away in Lyndahl. The closest rail loading facility is at Salina approximately 35 miles to the west. Rail facilities are also present at Price which is approximately 70 miles to the northeast.

Opposition to any surface mining operations in this area may arise because of environmental considerations involving the tract's proximity to the San Rafael Swell, a scenic area to the south, the Capital Reef National Park which is located 15 miles to the south; and I-70 which is a major tourist route.

If a mine plan is timely submitted and approved it is possible that the block could meet the diligent development requirements by 1986. This is primarily possible since surface mining operations will precede the lower production underground operations.

#11

SUNNYSIDE SOUTH TRACT

KAISER STEEL CORPORATION

MAP LOCATION U-7

FEDERAL COAL LEASES: SL066490
SL069291
U014217
U014218
U0126947
U0126948

EMERY COUNTY, UTAH

The Sunnyside South Tract held by Kaiser Steel Corporation consists of six federal leases and two state leases with a combined acreage of 8931.31 acres. The tract is located 12 miles southeast of the existing Kaiser Sunnyside operation and 13 miles southeast of Sunnyside, Utah.

The prevailing seams in the area include the Upper and Lower Sunnyside and the Gilson seam. Seam thicknesses range from a minimum of five feet to a maximum of 14 feet. The regional dip of the seams that would be mined varies from 5 to 15 degrees, but is generally less than 10 degrees. Estimated recoverable reserves are 66 million tons with a BTU content of 12,000 to 13,000 and a sulfur content of one to two percent.

The projected method of recovery is either longwall or room and pillar using continuous miners for coal extraction. The question as to which of these methods is most suitable can only be resolved when more information is available. Faulting has not been a problem in the area. However, mining conditions will be made more difficult by depths of cover which range from 2000 to 2500 feet.

Diligent Development Analysis

The Sunnyside South Tract was originally acquired by Kaiser as an additional source for metallurgical coal. Testing has indicated that the coals from this deposit would not be suitable for this use but could be marketed as a steam coal. It has been reported that Kaiser is definitely interested in bringing the deposit into production, perhaps with the help of a joint venturer. However, it is considered unlikely that this will happen before 1991.

#14A

EMERY COUNTY TRACT

NEVADA ELECTRIC INVESTMENT COMPANY

MAP LOCATION U-12

FEDERAL COAL LEASES: U38727
U024316
U020668

EMERY COUNTY, UTAH

The Nevada Electric Investment Company holdings in Emery County consist of three federal leases with a combined total acreage of 3166.1 acres. Leases U38727 and U020668 are contiguous and it is not known if they are connected to U024316 by fee land. The leases are located directly to the souther of the Haiwatha Complex of U.S. Fuel Company.

The coal seams on the Nevada Electric Properties are all located in the Blackhawk Formation. These seams and the others in this general area comprise the Wasatch Coal Field. Seam thicknesses range from 6 to 10 feet with some rock splits being present. The seams are cut off along the western boundary of the lease block by the Bear Creek Fault which is a major normal fault in the area with a reported displacement of 250 feet.

Reported recoverable reserves on the leases include 20 million tons on U38727 and U020668 and an additional 18 million tons on U024316. These reserves are located in two seams rather than the four seams scheduled for mining on the Hiawatha Complex.

Mining conditions in the area are generally good. It is assumed that the coal reserves on the Nevada Electric leases would be extracted using the room and pillar technique in use by U.S. Fuel Company, although there has been some consideration by U.S. Fuel of implementing longwall systems in two of its seams.

Diligent Development Analysis

The reserves available on the Nevada Electric tract are good, mineable coal. At this time there is no indication that the company is actively trying to develop the properties. This development could occur as new mines or possibly in conjunction with U.S. Fuel Company. This latter company's operations are scheduled to go on for another 20 years, so it would require an increase in productiodn rate to go into combined production with Nevada Electric and still comply with the due diligence requirements. Short of this, it is not believed that Nevada Electric will have its leases in production by 1991.

#15A

EMERY COUNTY TRACT

UTAH POWER & LIGHT

MAP LOCATION U-10

FEDERAL COAL LEASES: SL051221
U014275
U024317
U024319
U06039

EMERY COUNTY, UTAH

This block of leases which is held by Utah Power & Light is located two miles north of the existing portal for that company's Deer Creek-Wilberg operation. Total acreage in this tract is 2961 acres.

It is reported that at least one of the five leases, U06039, can be accessed for development from the Deer Creek-Wilberg complex. If this underground access could be extended to the other four leases, either by connected underground workings or a specially constructed rock tunnel, then it would avoid the necessity of establishing surface access through a narrow, steep-walled canyon.

Reported recoverable reserves for the leases are 42 million tons. It is assumed that the quality characteristics of these reserves approximate those of the Deer Creek-Wilberg reserves. These include a BTU content in the range of 11,400 to 12,900 and a sulfur content of 0.51 to 0.55 percent.

There is some problem with faulting in the area, but generally mining conditions are good. The existing Utah Power & light mines use a combination of room and pillar and longwall mining techniques for coal recovery. It is reasonable to assume that one or both techniques will be used to mine the coal on the additional leases.

Diligent Development Analysis

The existing Deer Creek-Wilberg complex has a remaining life of only 15 years. Since these mines occupy a very important role in supplying fuel for the company's power plants, it is quite likely that the new leases will be used to extend the life of the existing coal production complex. This could be accomplished by adding the five leases to the existing LMU. Hence, the leases would not be in production by 1991 but would be part of an LMU that would be in compliance with the diligent development requirements.

#17

COLOMBO TRACT
SWISHER COAL COMPANY
MAP LOCATION U-5
FEDERAL COAL LEASE: U020641
EMERY COUNTY, UTAH

The "old Colombo lease", which is now held by Swisher Coal Company, is located near that company's Gordon Creek #2 mine and has an approved acreage of 1908.66 acres.

The reported recoverable reserves are 28.0 million tons. These reserves would be recovered from two seams, mostly by room and pillar using continuous miners for coal extraction. The coal quality characteristics for the Hiawatha and the Castlegate A seams, as they are currently bieng mined in the Gordon Creek #2 mine, are:

	Hiawatha	Castlegate A
Sulfur	0.56%	0.45%
Moisture	7.20%	7.77%
Ash	6.50%	8.01%
Volatile Matter	41.30%	41.74%
Fixed Carbon	44.60%	42.48%
Btu/lb	12,144	12,177

The faulting that is found on the Gordon Creek property also extends to the Colombo Tract. The faulting at Gordon Creek has had a significant impact on the mining operations at that property. This is also expected to be the case for the Colombo property.

Diligent Development Analysis

Current projections indicate that the reserves on the existing Gordon Creek LMU will be depleted in 1987. It is reasonable to assume that the Colombo Tract will be used as a means to keep the Gordon Creek complex in operation. The two tracts are separated by both federal and state lands, so it will be necessary to acquire these lands and incorporate them and the Colombo Tract into the Gordon Creek LMU. It should be possible to accomplish this by 1991.

#29

SEVIER COUNTY TRACT

COASTAL STATES ENERGY COMPANY

MAP LOCATION U-18

FEDERAL COAL LEASE: U053995

SEVIER COUNTY, UTAH

The Sevier County Tract held by Coastal States Energy Company consists of a single Federal lease with a total acreage of 160 acres. It is near, but contiguous with, that company's Convulsion Canyon operation in Sevier County, Utah.

Reported recoverable reserves for the property are only 500,000 tons. It is assumed that these reserves are in the Upper Hiawatha seam which is currently being mined at Convulsion Canyon. At the Convulsion Canyon mine this seam has a minable thickness which varies from 6 to 15 feet. The reported coal quality characteristics include a BTU content of 11,500 BTU per pound and a sulfur content of 0.6 percent.

Mining conditions in the area are generally quite good. Any hindrance to development would come not from the quality of a potential mine but rather from the small size.

#29

Diligent Development Analysis

Coastal States Energy Company has stated that it fully plans on mining the reserves on this lease. One indicated possibility is to divert equipment from the existing Convulsion Canyon operation to conduct mining operations. However, the total recoverable tons on this isolated tract is equivalent to less than one-third of the current annual production at Convulsion Canyon.

If the company does decide to mine this tract, it is considered unlikely that this would take place before 1986.

65'

#30

SEVIER COUNTY TRACT

ENERGY RESERVES GROUP, INC.

MAP LOCATION U-18

FEDERAL COAL LEASES: U014117
U0141176
U0141178

SEVIER COUNTY, UTAH

The Sevier County Tract held by Energy Reserves Group consists of 5345.6 acres divided over three federal leases in eastern Sevier County, Utah. It is in the vicinity of Coastal States Energy Convulsion Canyon Mine.

This lease block is located approximately one mile south of Energy Reserves Group proposed Skumpah Canyon mine. Information available from this proposal indicates that the reserves for this lease block are located in the Ivie seam. The recoverable reserves for this lease block is 29 million tons. This compares with an estimated 46 million recoverable tons on the Skumpah property. Coal characteristics for seams in the area are given to be 11,000 and 11,500 for a BTU content and a sulfur content of approximately 0.5 percent.

Mining conditions in the area are considered to be good. The Musinia fault zone contains normal faults, which are either vertical or steeply dipping. Vertical displacements within the fault zone exceed 2,000 feet. These major faults will not affect mining operations. However, there are two minor northwest trending faults, with estimated vertical displacements of about 20 feet, which could affect mining. If the faulting does not become a problem, the estimated seam thickness of 9-10 feet with good seam continuity could provide acceptable conditions for longwall mining.

Diligent Development Analysis

The Energy Reserves Group has already submitted a mine plan for the Skumpah property. Therefore, it would appear that the company will proceed with the development of that property for the present time. This means that the company's remaining three leases in Sevier County will not be in production by 1986. It remains questionable that these leases will be in production by 1991, even though they contain good, mineable coal.

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KAIPAROWITS TRACT

CONSOLIDATION COAL COMPANY

MAP LOCATION U-17

FEDERAL COAL LEASES:

U0103107	U0149373
U0103109	U098783
U0103129	U098784
U0103130	U098785
U0105418	U098787

KANE COUNTY, UTAH

The 10 Federal coal leases held by Consolidation Coal Company on the Kaiparowitz Plateau include a total acreage of 25,533.41 acres. The leases are all contiguous and are adjacent to and to the north of the lease blocks held by El Paso Natural Gas Company and Peabody Coal Company.

The current estimate of recoverable reserves on the Consol lease block is 406 million tons. Considerable additional drilling and information gathering will be required before anything really definitive can be said about the property, so this estimate of reserves should be considered only as an order of magnitude estimate.

Some information concerning the coal seams on the Consol lease block can at least be inferred from data which is included in the proposed mine plan for the adjoining El Paso Natural Gas lease block. Coal will be recovered from a total of nine seams ranging in thickness from 6 to 22 feet.

The overall recovery ratio of 50 percent is based on the use of room and pillar mining with no attempt to recover all of the seam thickness for the thicker seams. The quality of the coal mined from the different seams and the different parts of the lease block will vary from about 11,000 to 12,000 BTU's per pound and will contain from 0.4 to 1.2 percent sulfur.

Diligent Development Analysis

The coal reserves controlled by Consolidation Coal Company on the Kaiprowits Plateau constitute a massive quantity of above average coal. The two major impediments to the development of a new mine in this area by Consol is the lack of adequate rail transportation into the region and the potential for environmental degradation. Considerable public pressure has been developing against the approval of this proposal and those for other mining developments in south-central Utah. Potential legal and political actions by the groups opposing these mines should keep the mines out of production until well after 1991.

KANE COUNTY TRACTS

PEABODY COAL COMPANY

FEDERAL COAL LEASES

U0103108 (2,560.00 Acres)
U0103131 (2,560.00 Acres)
U0103132 (1,271.68 Acres)
U0103133 (1,273.16 Acres)
U0115656 (2,560.00 Acres)
U0115657 (2,560.00 Acres)
U096476 (2,551.51 Acres)
U096477 (1,276.68 Acres)
U098786 (2,549.60 Acres)

KANE COUNTY, UTAH

The Federal leasehold, consisting of 19,162.64 acres, is on the Kaiparowits Plateau about 30 miles north of Page, Arizona, and about 28 miles south of Escalante, Utah. The leasehold is bordered on the west by leases held by El Paso Coal Company, on the norther by leases held by Consolidation Coal Company, on the south by open Federal land and on the east by the Straight Cliffs which drop 2,000 feet over a one mile distance. The surface topography in the area of the leasehold is generally rough and intersected by numerous canyons.

Nine bituminous coal beds have been identified in the general area, but on the leasehold only five of the coal beds are considered to be minable. Due to the lenticular nature of the coal in this area, the five beds are not continuous throughout the leasehold. The coal beds range in thickness from 4 to 14 feet and have a dip of 0 to 8 degrees. An average proximate analysis (as received) follows:

Moisture	13.0%
Ash	2.0%
Sulfur	0.6%
Fix Carbon	45.0%
Heating Value	11200 Btu/lb

The coal beds are underground minable and may be mined utilizing continuous mining or longwall equipment. The use of longwall equipment may be infeasible or overly restricted due to the lenticular nature of the coal. The mine works of the beds will, in all probability, have to be superimposed in order to avoid critical stress overloads. Due to the maximum mining height of commercial mining equipment (12 feet) the recovery rate in the coal beds in excess of 12 feet will be somewhat lower than the beds 12 feet or less. In the beds 12 feet or less a 40 percent recovery rate should be achievable. It may be possible to increase the recovery rate in some beds but this could produce loads that would reduce the recovery in other beds. Also, if subsidence must be avoided the recovery rate may decrease.

Access to the coal beds may be possible through outcrops or via rock slopes. If these two approaches are not possible shifts would have to be developed. This property could possible support a mine with an annual production of three to five million tons. A three million tons per year mine would require approximately 15 to 18 continuous miner sections. To achieve a production of three to five million tons, multiple seams would have to be mined concurrently with the upper seams mined in advance of the lower.

Upon completion of the surface and access development work, it would take approximately four to five years to achieve a three million ton annual production. The mine could reach the tonnage required for diligent development by the time full production is reached. Action would have to be taken by the lessee immediately to obtain an approved mine plan so that the 1986 diligent development deadline can be met. Extension of the diligent development requirement past 1986 may be granted under certain conditions.

Various methods to transport coal off the Kaiparowits Plateau have been studied but to date the studies have not proceeded into the implementation stage.

SOUTH NIPPLE BUTTE

HIKO BELL

LEASE NUMBERS U0146654 (2,560 Acres)
U0118366 (1,920 Acres)
U0120794 (1,920 Acres)

KANE COUNTY, UTAH

The leasehold is located approximately seven miles from Glen Canyon City, Utah. Lease numbers U0120794 and U0146654 are located within the withdrawal for the Glen Canyon National Recreation Area. The leasehold is accessed via an unimproved dirt road. The topography over this leasehold is generally rough with a relief of 1,500 feet being obtained within one mile.

Three bituminous coal beds of minable thickness have been identified over the leasehold, however, one lease contains only two seams due to the lenticular nature of the coal beds in the area. The beds range in thickness from four to seven feet and have a two degree dip. An average proximate analysis (as received) for the three beds follows:

Ash	8.5%
Moisture	9.0%
Sulfur	0.68%
Fixed Carbon	49.2%
Heat Value	12700 Btu/lb

The majority of the coal, approximately 40 million tons, in the leasehold is underground recoverable with approximately four million tons surface minable along the outcrop at the southwest corner of the leasehold.

The underground recoverable coal could be mined with continuous mining equipment or possibly longwall equipment. The utilization of longwall equipment may be hindered by the lenticular nature of the coal. Access to the coal will, in all probability, be made through the outcrop via rock slopes in the southwest area of the leasehold. A coal transportation system does not exist in the immediate area, but numerous rail and/or conveyor belt systems have been proposed and studied by various industrial and utility concerns.

The leasehold could support a one million ton per year mine utilizing five to six continuous mining sections. The mine works for the different seams would have to be superimposed to prevent critical stress overloads. The seams would be mined out starting with the upper seam and advancing downward. Utilizing total extraction mining methods, 50 to 75 percent of the underground in-place reserves would be recoverable. The recovery rate could decrease appreciably if it was determined that subsidence, which could result from the total extraction methods, was undesirable and should be prevented.

Upon completion of surface development and access to the coal beds, the lessee could achieve the diligent development requirement within three years and could reach full production within five years. Due to the lack of an improved coal transportation system in the immediate area, it is not believed that diligent development levels could be reached by the 1986 due date.